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AGRICULTURE AND CLEAN WATER. PROCEEDINGS OF A CONFERENCE HELD AT KANSAS CITY, MISSOURI ON 3 APRIL 1975

Cecil C. Chappelow, Jr.

Midwest Research Institute

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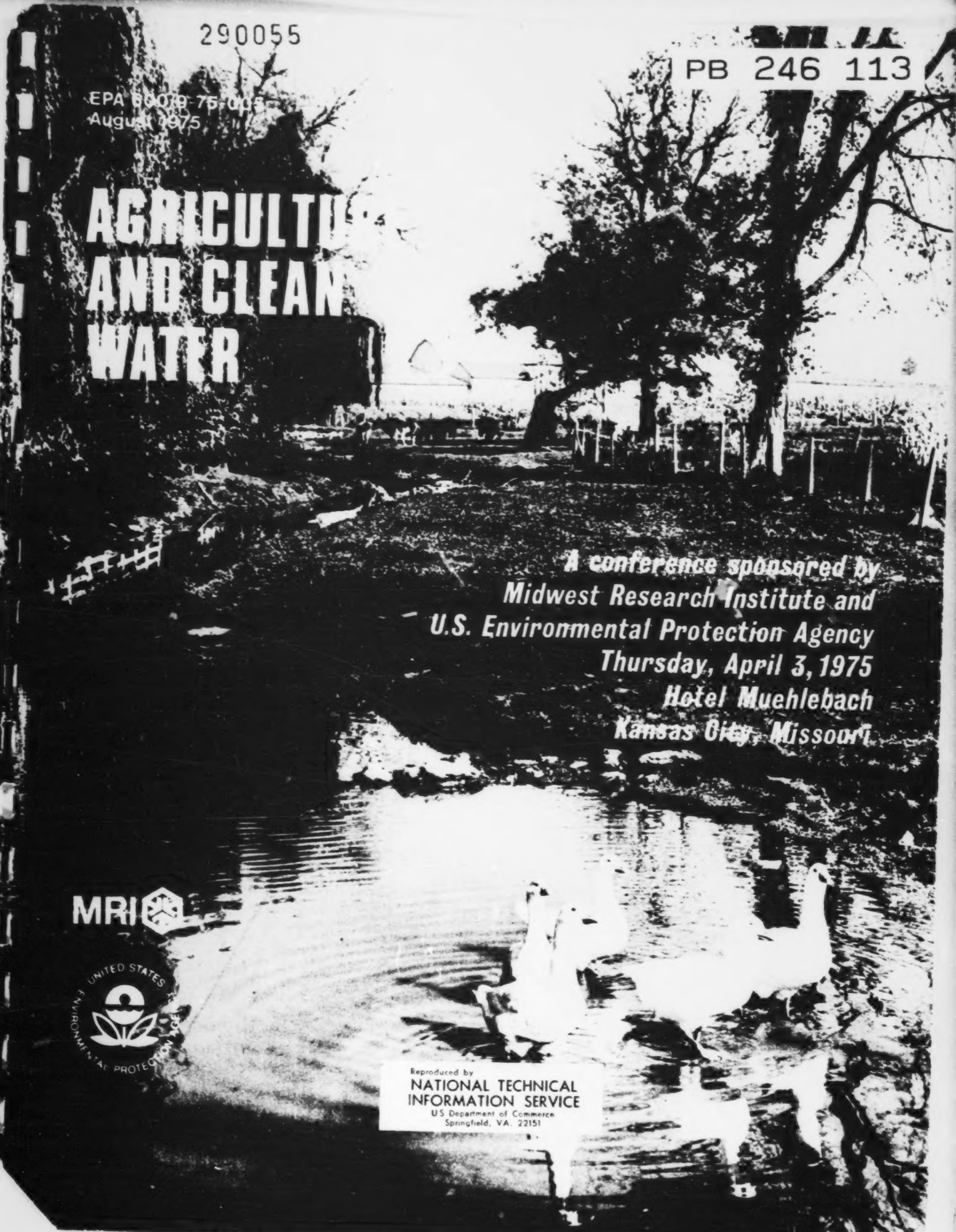

AGRICULTU AND CLEAN WATER

A conference sponsored by
Midwest Research Institute and
U.S. Environmental Protection Agency
Thursday, April 3, 1975
Hotel Muehlebach
Kansas City, Missouri

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16. ABSTRACT

A 1-day conference was held to promote a constructive dialogue on the development of plans for the control of agriculture related nonpoint source pollution arising from sediment erosion, fertilizer runoff, livestock wastes and pesticide residues. The morning session was devoted to an analysis of the state of the art on nonpoint source pollution related to agriculture with presentations on: (1) regional aspects and viewpoints; (2) agricultural pollution control; (3) technical basis of control; (4) conservation districts; (5) soil conservation; and (6) plant nutrients. The luncheon session was concerned with an economic overview, consisting of an address on economic problems and opportunities of pollution control. The afternoon session was designed to explore elements of control strategy planning for nonpoint pollution from agricultural sources with papers on: (1) the states' role; (2) one state's approach; and (3) the role of the farmer and agribusiness. The afternoon session was concluded with a panel discussion on the development of a practicable agricultural pollution control plan. Over 175 individuals from 20 different states representing local, state, regional, and federal agricultural and environmental agencies attended the conference. Also, included in the 75 different organizations represented at the conference were attendees from farmer associations, educational institutions, and agribusiness.

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FOREWORD

The 1972 Amendments to the Federal Water Pollution Control Act very clearly mandate that nonpoint sources of pollution shall be assessed for significance, and shall be controlled in manners commensurate with significance. However, the law is nonspecific about controls, both in the technical/engineering sense and in the political/regulatory sense, except that the states are given ultimate responsibility in both areas, subject to federal approval.

Agriculture is a major source of nonpoint pollutants--nutrients, pesticides, sediment, and organic matter, in particular--and it is evident that agriculture will be identified as a prime candidate for development and imposition of controls. However, the control problems are complex and their resolution can have far-reaching impacts on agricultural economics, production capacity, agribusiness, and even the sociology of the farm community.

Against this background, Midwest Research Institute with the cooperation of the Environmental Protection Agency, planned and developed this "Agriculture and Clean Water" Conference. The purposes of the conference were:

* To assess the state of the art on nonpoint source pollution related to agriculture.

* To explore the elements of control strategy for nonpoint pollution from agricultural sources.

* To promote discussion of the development of a practicable agricultural pollution control plan.

The topics of the presentations were selected on the basis of their potential to aid in the understanding of the control problems facing the agricultural sector and the technical/management possibilities that can be utilized by the regulatory agencies in the formulation of control plans.

The conference brought individuals from many disciplines and interests together to mutually discuss technical, regulatory and economic aspects of the nonpoint source pollution control problems facing agriculture.

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Over 175 individuals from 20 different states representing local, state, regional and federal agricultural and environmental agencies attended the conference. Also included in the 75 different organizations represented at the conference were attendees from farmer associations, educational institutions and agribusiness.

These proceedings are the product of the presentations and comments recorded during the conference. It was edited and published by Midwest Research Institute with grant assistance from the Environmental Protection Agency.

MIDWEST RESEARCH INSTITUTE
Cecil C. Chappelow, Jr.
Cecil C. Chappelow, Jr.
Coordinator, Industrial Programs

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MORNING SESSION

INTRODUCTION OF SPEAKERS

H. M. Hubbard, Director
Physical Sciences Division
Midwest Research Institute

Dr. Hubbard:

Good morning - I'm Hub Hubbard, Director of Physical Sciences of Midwest Research Institute, and it is my privilege to chair the morning session of this Conference. Let me start by introducing you to my boss, the Executive Vice-President of MRI, Mr. John McKelvey, and by asking John to welcome you to Kansas City and to the MRI/EPA Conference on Agriculture and Clean Water.

OPENING REMARKS AND WELCOME

John McKelvey
Executive Vice-President
Midwest Research Institute

Mr. McKelvey:

Thank you.

Good morning. On behalf of MRI and the Environmental Protection Agency I want to welcome you all to the Conference this morning and to Kansas City.

The objective of this Conference is to provide an opportunity to explore the elements of a reasonable and effective plan for control of nonpoint source pollution. Evidence is increasing that agricultural activities as an industry may be a significant factor in nonpoint pollution. Thus, the emphasis of this Conference has been placed on the development of a practical agricultural pollution control plan.

The formulation of such a control plan is a real challenge, and I think it illustrates the complex nature of many things in today's world. This plan has to satisfy the demands for achieving maximum food production and efficient energy use and yet within the same framework must also be responsive to the necessity of insuring sound environmental quality and valid resource conservation, and these are pretty tough tasks.

The formulation and implementation of this plan are appropriate topics for discussion. Their resolution can have effects ranging from relatively small technical changes in crop-growing procedures to far-reaching impacts on agricultural economics, agricultural capacity, agribusiness, and even the sociology of the farm community.

Some of the specific issues as we see them are:

How well do we really understand the fundamental aspects of agricultural pollution?

Do we really have enough basic data on pollutant generation?

Do we understand the mechanisms of transport and generation well enough to formulate control techniques and strategies?

Do we have the ability to estimate with reasonable accuracy the various impacts on water quality?

What are the technical and energy options for control?

What are the technical and economic requirements of such control options?

What are the political and regulatory options and their impacts?

And what are the socioeconomic impacts?

I don't think anyone expects that a 1-day conference can be expected to cover all these areas in detail nor is it likely to lead to any type of a consensus on what should be done, particularly on any of the more controversial issues, but we do hope that the conference will provide the opportunity for stating and clarifying some of these issues, and perhaps we can gain some consensus in some of the areas. In any event, I hope that through this Conference all of you will achieve a greater appreciation of the complexities of the problem.

I suspect that through our discussions today we will be able to lay out some of the technical and engineering controls in general, though probably not in any great detail, and also that we will be able to discuss the advantages and disadvantages of various controls.

I hope that the political and regulatory aspects of the problems will be discussed along with the sensitive socioeconomic issues. Probably these latter areas will tend to remain controversial and unresolved, except through actual experience.

In short, I hope the conference will make a real contribution to a general understanding of the problems and will serve as the takeoff point for positive action which involves the very many activities of the organizations and individuals that are represented here today.

We are most grateful to all of you for taking the time to be with us. We particularly appreciate the cooperation of the Environmental Protection Agency, the Soil Conservation Service, and the state governments for supplying today's well-informed speakers. I know I'm personally looking forward to their presentations.

Thank you.

Dr. Hubbard:

Thanks, John.

Midwest Research Institute regards itself as regionally concerned. I always like to say we are regionally concerned, but nationally competent; I think we have to be that way. We tend to look, therefore, at nonpoint source pollution as a regional problem. It is that; but it is a national one too.

I joined MRI in 1970, and the second day I was here I went down to the conference room where three or four of the bright young people on our staff were making a presentation to representatives of the EPA about the importance of doing a baseline study of nonpoint source pollution in the Missouri Valley. It was the first time I had ever head the term. It was a very impressive presentation--you see, I can say that because I didn't have a damned thing to do with it--and the EPA people seemed to think it was also. I expected in my naivete that in 2 months we would have the program going. It took 2 years, but it did get going.

Shortly after that first meeting, the lead-off speaker this morning, Jerry Svore, came out to see me. We talked about nonpoint source pollution and the necessity of knowing its impact on water quality in order to judge the efficacy of point source treatment in this area. We're still talking about that subject today, but we are considerably more knowledgeable.

Jerry, you know, is the Regional Administrator for the EPA in Region VII.

Jerry is indigenous to the region, as is the problem. I don't think he's part of the problem; I think he's part of the solution. He was born in Norway, Kansas, on the banks of the Republican River, and I understand that is the place to be born, if you are a senior official in the EPA these days. It gets you started out with the right orientation, at least.

He was educated at North Dakota and Harvard; he is a commissioned officer in the Public Health Service. I'm an ex-sergeant in the Signal Corps, so when I find somebody who is a Rear Admiral in the Public Health Service, I'm a little awed and don't quite know how to react.

But at any rate, it's a real pleasure to have Jerry here today as part of the solution.

Jerry Svore.

THE REGIONAL POINT OF VIEW

Jerome H. Svore
Regional Administrator
Region VII - Environmental Protection Agency

Mr. Svore:

Thank you.

I appreciate all your fine comments, and I do appreciate the opportunity to see as many of my friends in the audience as have shown up here today.

I hope that as a result of this meeting during the day that we will make some progress towards what we consider probably the most important pollution control problem we have in this region, and I certainly don't have to tell this audience that we are discussing a very complex subject.

I do not have to tell you that erosion control is a very complex subject. There are so many variables, uncontrollable inputs and sociological considerations that many of the individuals discussing this issue now prefer to use the word "reduce" when they speak of sediment pollution rather than the word "control." This difference over words seems indicative of the difficulty we experience in applying control techniques to nonpoint sources. Even so, I would like to compliment the individuals who developed the agenda for this Conference for placing the emphasis on the development of a practicable agricultural pollution control plan.

As control of point sources becomes more effective, the extent of nonpoint pollution can be more readily determined. It is already apparent in many areas that management of nonpoint sources is necessary to meet the water quality goals of Public Law 92-500.

EPA is committed to the management of both point and nonpoint sources. Section 208 of PL 92-500 requires the states "to control to the extent feasible. . ." nonpoint sources such as surface and underground mine drainage, agricultural and silvicultural runoff, construction activity related sources, saltwater intrusion and drainage from disposed wastes or pollutants. Management of such sources will be the states' responsibility. Today, we will be concerned with only one of the nonpoint problems--agricultural runoff.

Nonpoint source management has not been emphasized by EPA previously, as the Act itself places greater emphasis on control of point sources and establishes no mechanism for federal funding or sanctions for nonpoint control. In many areas of the country, however, nonpoint sources are a greater threat to successful water quality restoration than point sources. EPA's responsibility, although not well defined in the Act, is to provide encouragement and guidance to the states to initiate planning and implementation of nonpoint control so that the 1983 goals may be reached.

EPA's guidance to the states will strongly emphasize the importance and value of preventive approaches as opposed to capital-intensive efforts. States will be encouraged to institute their own set of Best Management Practices tailored to their particular problems and environmental conditions. In most cases, these practices will be land management techniques. Many of these are either already practiced on a limited scale or are being developed through EPA, state, and other federal agency research and field projects.

We have known for a long time what to do, but how to get these practices adopted down on the farm has always been the real problem. Hopefully, everyone at this Conference will have a lot to say about the practical side of erosion control. I would like to take the lead by pointing out a few of the practical problems I think will confront state and local officials and landowners--regardless of what type of control program is finally adopted. But first, I have been asked to say a few words about the regional view on nonpoint pollution.

As I have said, the Federal Water Pollution Control Act requires the states to develop a statewide plan to control nonpoint pollution. Federal guidelines and basic requirements are being developed to determine the character of these state programs. This agency would like to see realistic and workable state programs developed which are capable of reducing agricultural pollution in time to effect 1983 water quality goals. An ambitious undertaking!

It is very important that the states assume the leadership role in establishing land use management programs that they are convinced are both proper and workable.

EPA has received a substantial amount of adverse criticism from members of the agricultural community concerning our position on agricultural pollution. Here is a rather typical comment made by the editor of a farm publication. This gentlemen asked ". . .rather than have non-ag people such as EPA officials develop new and expensive programs to solve the problems of agricultural pollution, why not shift authority and financing of these 'conservation' efforts from EPA to USDA where Extension and the Soil Conservation Service have excellent track records." I answered this gentlemen by telling him I was not aware of any non-ag EPA people developing new and expensive programs for nonpoint agricultural pollution. In fact, I quoted a section from the Agricultural Pollution Control Policy for Region VII, ". . .since the destruction of our land resources constitutes the primal cause of agricultural water pollution, it is accurate to say that at least in the area of agricultural pollution control, EPA and USDA goals coincide. The support of programs designed to promote soil stabilization can, therefore, legitimately demand the attention of both agencies.

"In pursuit of this joint EPA-USDA goal, it would be self-defeating for EPA to create rival programs. Soil stabilization efforts of Soil Conservation Service, the Extension Service, and the State Agricultural Experiment Stations will result in the most rapid and efficient movement toward the control of agricultural pollution."

This has been our regional policy and position on agricultural pollution for more than 3 years. Regardless of what anyone thinks of the merits of this particular policy, one thing is quite clear--our policy on the control of agricultural pollution reflects the important contributions that various USDA agencies have made and are continuing to make to reduce sediment pollution.

Initially, state responsibilities will involve assessment of the nature and extent of agricultural sources of pollution and establishment of a set of priorities for planning and implementation purposes. Some states may choose to deal with several problem areas simultaneously, while others may have the resources to deal with only one type of nonpoint source at a time. If resources are limited, nonpoint sources which are most readily addressed should be dealt with first.

Once priorities have been determined, states can initiate programs to plan for the management of nonpoint sources. Regulatory programs for nonpoint source management should be implemented at the lowest effective governmental level. Regulation of nonpoint sources in most cases will require additional legislative authority to implement the best management practices for pollution control on a statewide basis. Those states without adequate legal authority to adopt such a regulatory program will need to acquire it. The states that already have the necessary authority are encouraged to move forward with planning and implementation of a regulatory program.

I assume the majority of states will base any erosion and sediment control legislation on the Model Law. If this assumption is correct, the vast majority of states will give local soil and water conservation districts the responsibility of writing and enforcing farm conservation plans. I suspect that the majority of farm plans already written under a voluntary conservation program reflect fairly well what the landowner intends to do because the landowner has already demonstrated his interest in conserving his soil and water resources. So there should be few enforcement problems with these people. But what about those landowners who have remained uninterested in soil and water conservation? When plans are written for these people, will the primary emphasis be on what is needed to reduce erosion, or will they reflect what the farmer can be persuaded to do? In short, will district activities begin to gradually shift from the conservation of soil and water resources to a primary emphasis on compliance with the law?

The problem is aptly illustrated by the results of a study by Professor Earl R. Swanson of the University of Illinois entitled "The Economic Analysis of Erosion and Sedimentation in the Mendotta West Fork Watershed." This report attempts to evaluate the effects of crop rotation, tillage systems, and conservation practices within this watershed, based on two parameters: (a) net farm income and (b) off-site sediment damage. The estimated net farm income and the corresponding off-site sediment damage are then combined to develop a total cost-return analysis of the consequences of erosion and sediment damage. This is certainly the type of information required for policy decisions even though, in this instance, we are talking mainly about one watershed.

In researching the relationship between net farm income and soil loss, two types of analyses were carried out in this study: (a) a single-year analysis of income and soil loss rates per acre, using selected crop combinations and land treatment practices and (b) a 20-year period analysis of the same variables with the results shown in terms of annual rates of income and soil loss. The work by Swanson produced some very interesting conclusions. He points out that if we assume a farmer is either uninformed or not interested in the loss in farm productivity he will experience from soil erosion, he would probably choose to raise continuous corn, plant up and down hill, and use a conventional tillage system.

But what if the farmer is interested in and informed about erosion and its consequences? This report clearly indicates that even if he is both interested and informed, there is still little reason for the farmer to be conservation-minded if he is motivated by strictly monetary goals. This conclusion holds true if the cost-return analysis is extended over a 20-year period. Mr. Swanson points out that it is difficult, if not impossible, to demonstrate to the individual farmer during his lifetime that soil and water conservation is profitable farm activity.

A glance at the data collected by Mr. Swanson on off-site sediment damage shows an entirely different cost-benefit ratio: where off-site sediment damage is considered, the total damage from soil erosion increases more than tenfold. It would appear that the overall cost of soil erosion is sufficiently large so that if it were considered by the farmer along with all other costs, he would be forced to select a different crop rotation, conservation practice, and tillage system.

What conclusions can be drawn from this study of erosion and sediment problems on one watershed?

One, already mentioned, and supported by other research, is that it is next to impossible to sell conservation to the farmer as a profitable agricultural activity. In the words of one Missouri farmer to his County

Agent, "Why should I listen to your advice when I already know how to farm better than I am." In addition, research shows the big costs of erosion and sediment damage are borne by the general public. And finally, according to current research, the cost of on-farm erosion and sediment control is many times less than the cost of repairing off-site damage. In short, dollars-and-cents economics would lead one to conclude that legislation is a necessity, and yet dollars-and-cents economics cannot be our only consideration for proposing legislation.

One can easily see that the complexity of the decision-making process escalates rapidly when we add political, social, and environmental considerations to an economic analysis.

We are aware that some states are placing much of their conservation emphasis on a wider adoption of better tillage practices rather than on mechanical structures. Of course, purchasing any piece of conservation tillage equipment requires a major capital outlay. If such production inputs as fertilizer, fuel, seed, etc., continue to climb in cost without a corresponding rise in farm prices, can we require the farmer to make such a major capital outlay? Or will modified conservation tillage be an acceptable alternative until the farmer is willing to purchase new conservation tillage equipment? Is it true that most farmers are already moving toward some form of conservation tillage within the limits of their equipment capability in order to farm more acres and to conserve fuel costs?

I would like to conclude by repeating an earlier statement that the primary concern of this Conference is the development of a practicable agricultural control plan.

By exploring the many aspects of these questions, this Conference will hopefully result in an outline of a practical proposal for solutions to erosion and sediment problems.

Dr. Hubbard:

We have some time for questions. If you have questions for Jerry, I would appreciate it if you identified yourself and your organization.

Would you mind answering questions, Jerry? Let's see if you have any. Why don't you come back up here.

Are there any questions or comments at this point?

Mr. George E. Dissmeyer (U.S. Forest Service, Atlanta, Georgia):

You made mention of the dollars-and-cents evaluation that conservation is going to return to the farmer versus the cost in sediment damages and then you made a statement that I missed. Did you say that the cost in damages is more than--I didn't follow you there.

Mr. Svore:

Well, the point was that when you make a cost analysis and just stick to the farm and the damages there, you come up with an entirely different analysis than you do if you take into consideration the off-site damages resulting from the erosion from that farm. If that was the point that you were questioning, the economic balance when you take into account the damage to society, there is no question but what controlling it on the farm is economically justified.

Mr. Bob Schultz (Department of Agricultural Economics, University of Arkansas):

If we follow Dr. Swanson's research and we know that the externalities, the external costs associated with the sedimentation, are greater than the on-site costs of control, is EPA doing anything to establish economic incentives, either in terms of effluent charges, taxation or subsidies, to farmers for installing this type of control mechanism?

Mr. Svore:

EPA is not promoting any legislation that would lead to that. The answer to the question is no.

We did, of course, within the Department of Agriculture have the weed program which was along the line of the thing that we are talking about, but that is not operating at a. . . it never did operate at a level to attack this problem. In this area, if 80%--and I say if--of our pollution problem is nonpoint source from agricultural runoff primarily, you can see that the ratio of the kinds of monies that we are spending for point source versus nonpoint source are considerably in balance as far as this region is concerned. But obviously these kinds of things are decisions that Congress must make and the administration must make as to whether we put our dollars in the overall aspect of a balanced national budget or an imbalanced national budget.

Mr. David Nichols (Texas Water Quality Board):

You alluded to utilizing the more local level governments rather than, perhaps, the state government in controlling nonpoint source pollution in agriculture or whatever. In Law 208, as I read it and as other people in Texas have read it, the water pollution control agency for the state has to assume the planning role for the state. Were you referring to something else other than planning?

Mr. Svore:

Well, if you are ever going to put anything into effect, someday somebody is going to have to do something, and I was merely referring in that case to the fact that the doing comes down to the lowest level of government in this if you are going to make it a success, and I was expressing the regional opinion on that part of it. It seems to me that the only practical approach to it is to get down to the lowest level to actually come out with the recommendations, the things that should be done and, if it gets to an enforcement point, even down in that area.

Mr. Nichols:

Are you talking about local level government for implementing controls?

Mr. Svore:

Right, your soil conservation districts, I'm talking about that level.

Mr. Nichols:

Would the state still retain the responsibility?

Mr. Svore:

They would still retain the responsibility, yes.

Mr. Nichols:

For seeing that it is done?

Mr. Svore:

Certainly.

Mr. B. L. Harris (Texas Agricultural Extension Service, Soil and Crop Sciences Department, Texas A&M University):

You commented several times about its being the state's role and responsibility to assume the control and regulations of nonpoint source pollution. Assuming the state is reluctant in acting, what pressures will EPA bring on the states to in fact act and establish these regulations?

Mr. Svore:

There are a lot of questions I could answer better than that one, if you would like to talk about industry.

Well, as I think I indicated throughout the entire talk, we are plowing a lot of new ground, and no pun intended, in this whole area of control and as far as EPA's responsibility in this area. There are no clear lines of legal enforcement authority expressed in 92-500 in this regard. It lays the problem on the state, obviously, because Congress did not know exactly which way to go, how firm to be with it, and I think these are the things that we are faced with in regional operations today. It's a matter of trying to come up with the right kinds of answers, trying to get the states to come up with the kinds of answers that they feel are a practicable solution to the problem, and the kind of influence that EPA is going to have on the states is one of working with them and trying to get them to push the program.

I know that's not a clear answer, but Congress didn't give us one either, you know.

Dr. Hubbard:

Anybody else?

Yes.

Mr. Dick Amerman (Agricultural Research Service, U.S. Department of Agriculture, Columbia, Missouri):

You speak primarily of erosion and sedimentation here as regards nonpoint source pollution. What is EPA's forecast or outlook as far as dissolved nutrients in runoff is concerned, spreading of manure, use of fertilizers, and so on?

Mr. Svore:

Of course, obviously, the proper use of pesticides and the proper application of fertilizers will decrease erosion and sediment runoff by providing the optimum in crop production, so from the standpoint we are very much in favor of their proper use. It's one of the means of control that can be exercised. I wouldn't imagine with the price of fertilizer that there's going to be an excessive use of it in very many places. It wouldn't be an economic return that you would be promoting.

But, no, basically I have never heard anyone within EPA talk against the proper application of pesticides and fertilizers.

Dr. Hubbard:

Any other questions?

Dr. Dale H. Williams (Southwest Kansas Irrigation and Recreation Association):

Mr. Svore, you made the statement here that it was next to impossible to sell conservation to farmers. We work very closely with our irrigator groups in the southwest, and we find that the situation there is entirely the opposite in regard to the programs and to the means and ability of the individuals involved. They are very conservation-minded. It's a matter of economics with them, and in the past recent years they have come a long way in implementing those conservation practices into their farms. They work with it very closely.

I would like to see some modification of that statement, if we may.

Mr. Svore:

Well, I think the statement had to do with not being able to sell the farmer on conservation from a strictly economic standpoint. Obviously there has been a lot of conservation sold to the farmer. I didn't mean it in the context of your specific question at all. And you have some social conscious and long-range economically conscious farmers, of course, who recognize that in the long run this would pay.

What I was using as an illustration was this one watershed in a 20-year limitation on whether or not these kinds of practices were justified solely from an economic standpoint within the farm. That doesn't hold, necessarily, everywhere nor does it hold for indefinite periods into the future. Obviously we have got to sell the farmer on conservation, but for reasons other than just his own benefits during a brief period of time because that's going to be difficult to show economically. That was my point.

Mr. Williams:

Thank you.

Dr. Hubbard:

Anybody else?

Thanks, Jerry.

Dr. Hubbard:

One of the things I get to do is go to Washington about once a month to visit the bureaucrats, and I have to be careful about that term because places like the Midwest Research Institute exist because Washington policy-makers and Washington problem-solvers and maybe even Washington problem-generators need help and we try to provide that. Bureaucrat is an honorable profession and an honorable term. We need those kind of guys. I suppose some of you might argue whether we need that many or not, but we certainly do need them.

As I go through the marble halls of Washington, one of the offices I get into once in a while is that of the next speaker on the program. William C. Shilling. That name is really not right. Everybody calls him Chris. If you go into Chris' office you'll find he has the problems that many of the other people in the EPA have. That agency has one of the most able staffs of any Washington group, but they also have one of the most horrendous jobs. The offices are stacked high with paper, and they are always trying to find out what their new phone number is because somebody up there generates random numbers and makes the staff change offices every 3 months; I don't know why. So you find Chris Shilling working hard. His head is clearly in Washington.

But if you talk to him a little bit, you find that his heart still seems to be in Texas and Oklahoma. I think that combination of a head in

Washington and a heart in Texas and Oklahoma really is a pretty good background for dealing with the kind of a problem that Chris has to deal with.

He's Chief of the Nonpoint Sources Branch of the Water Programs and in that capacity he carries prime responsibility for generation of EPA policy and tactics relative to nonpoint source pollution.

Chris.

AGRICULTURAL SEDIMENT CONTROL FOR WATER QUALITY PROTECTION

William C. Shilling
Chief, Special Sources Control Branch
Office of Air and Water Programs - EPA

Mr. Shilling:

You know, there are advantages and disadvantages to being the second speaker on a program. The disadvantage is that you are going to be covering somewhat the same territory and maybe saying the same thing as the previous speaker, and I will be covering somewhat the same territory in many places. Of course, the big advantage is that the first speaker gets hit with a bunch of questions that I'm sure glad he got hit with instead of me.

I'm reminded a little bit, too, of an incident that happened in my house not too long ago. I don't know how many of you are familar with the book, "I'm Not Much, Baby, But I'm All I've Got." Well, my wife has tried to get me to read this book and she was giving me a sales talk there one night about it, and my 15-year-old boy was standing there listening. Finally he turned around to me and said, "Dad, you should really read that book." He said, "You're not much, Dad, but you're all we've got."

Well, I may not be much, folks, but I'm all you've got at the moment.

I'm also reminded of another story. You know, a speaker gets up and tells stories because he either has not much to say or doesn't have any substance to what he is going to say. I guarantee, I have some substance to what I'm going to say. It's just going to take a short period of time, I hope.

But I'm also reminded of another story. Many of you have heard this before. I have used it for many years, except it came out in Reader's Digest not too long ago, too. But it's about an old cowboy who was out in west Texas, some place close to Amarillo, I'm not exactly sure where it was, but anyway, he'd been out there a long time. And he happened to pick up a paper and he read about a revival that was fixing to take place over in Amarillo. He got to thinking about this. It had been a long time since he had been to church; maybe he ought to get up there.

So he got himself all spruced up and everything and he got up to the church where this revival was to take place, but unfortunately when he got there there was nobody there except the preacher. So he asked the preacher about this thing and the preacher says, "No," he says, "you must have made a mistake. That revival you were talking about was last week."

And this old cowboy says, "Oh, you know, I have driven all the way up here and everything." He said, "What am I supposed to do?"

And the preacher got to thinking about this and he said, "Yes, the Lord says, 'Feed my sheep,' and I have one sheep here." So he proceeded to get up on the pulpit and he expounded about an hour's worth of a real sermon.

After he got through and came down, he said, "Now, what did you think of that, sir? Did it help you?"

The cowboy said, "Well, preacher, I want to tell you one thing." He says, "When I go up to the north pasture and haul a load of hay up to the north pasture and only one old cow comes up, I don't give her the whole damned load."

I don't intend to give you the whole load this morning, and actually in terms of the title of this Conference I am probably only going to touch on one part of it, because what I have titled here on this talk is "Agricultural Sediment Control for Water Quality Protection." I purposely did this, simply because I think this is the first place we have to get to.

The subject of this paper leaves me a great deal of latitude. The paper could easily be consumed with a number of aspects of agricultural sediment control. However, most of these aspects are covered in papers by individuals far more expert in the field than I. I do not wish to infringe on any of their material so I will not attempt any unlearned specific discussions.

What I would like to do is proceed with a general discussion of the subject area. With this in mind, I would briefly like to discuss three major areas. These are:

1. Impact of agricultural sediments on water quality and the control of these sediments.

2. Nonpoint control features of Public Law 92-500.

3. State and local control programs.

The impact of agricultural sediments on water quality generally falls into three categories. First, there are the direct effects of the sediments.

The greater portion of these sediments eventually settle to the bottom of some body of water. They thus form a bottom sediment blanket that can smother the bottom organisms that form a part of the life chain of the water body. They also reduce the penetration of light into the water body which in turn affects the photosynthesis processes. Finally, they have an aesthetic effect.

Secondly, the sediments act as carriers of potentially pollutional materials. Many of the pesticides and nutrients reach waterways adsorbed to soil particles.

Third, and perhaps of lesser importance in terms of sediment, is the oxygen demands placed on the water body. Animal wastes and crop residue that form a part of the sediments in a total sense are organic materials and will utilize oxygen in their decomposition. In some few cases there can be a chemical reaction between the sediments and the water that will remove oxygen from the water.

Now, if we accept that the foregoing can happen, we must accept that agricultural sediments have an impact on water quality. The control of agricultural sediments must be a part of the total program to protect the quality of the nation's waters.

However, there seems to be a problem with the use of the word "control." At least in some agricultural quarters, there has been much ado about this word. I fail to understand this since agriculturists have been talking about erosion control throughout my lifetime. I would pose the question to you--is there any real difference between "erosion control" and "sediment control"? Really, I think they are the same thing.

Mud in the bottom of a reservoir certainly is not growing corn. Neither is fertilizer that is no longer on the field. Pesticides, intended to control insects, fungus, or plant disease on a farm, are killing the wrong things when they are in a stream.

I think the problem lies with the connotation some people place on the word "control" when it is used in connection with water quality protection. They immediately picture extensive collection systems and massive treatment works. While the collection and removal of agricultural sediments may be necessary in some critical water quality problem areas, agricultural sediment control primarily rests with what I call "management of the source." The agriculture land must be managed in such a way that the sediments do not exist in the runoff water.

In other words, agricultural sediment control and soil conservation are almost identical. If we recognize this, I believe we can jointly get about the business of Agricultural Sediment Control for Water Quality Protection without being hung up on the meaning of words.

Now, I would like to turn to the "Federal Water Pollution Control Act Amendments of 1972" or Public Law 92-500. This Act, I believe, recognized several of the items I have previously covered and provides us with a general plan for the control of agricultural sediments.

Public Law 92-500 delineates national goals and policy in Section 101. I would like to partially quote these goals and policies.

> "101(a)(1) It is the national goal that the discharge of pollutants into navigable waters be eliminated by 1985."

This goal is often misquoted as saying, "no discharge." It actually says "no discharge of pollutants." There is a major difference between "no discharge" and "no pollutants."

> "101(a)(2) It is the national goal that wherever attainable, an interim goal of water which provides for protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water be achieved by July 1, 1983."

> "101(a)(5) It is the national policy that areawide waste treatment management planning process be developed and implemented to assure adequate control of pollutants in each state."

> "101(b) It is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of states to prevent, reduce, and eliminate pollution,. . . etc."

If you will store these in your memory for a moment, I would like to turn to several sections of the Act that have particular bearing on the control of nonpoint sources. Because of their length, I will only partially quote these sections or paraphrase them.

> Section 102 provides that, "That Administrator shall . . . prepare or develop comprehensive programs for preventing, reducing, or eliminating pollution of the navigable waters and ground waters . . ." It further provides that such programs give due regard to fish, aquatic life and wildlife, recreational purposes, and withdrawals of water for public water supply, agriculture, industrial, and other purposes.

Comprehensive programs would, I believe, have to include nonpoint source controls if we are to prevent, reduce, or eliminate pollution of navigable and ground water.

> Section 104 states, "The Administrator shall establish national programs for the prevention, reduction, and elimination of pollution . . ." This section deals principally with research, investigations, training, and information. One subsection in particular, 104(p), deals with agriculture.

Section 304(e) provides that the Administrator shall issue information on (1) identifying and evaluating nonpoint sources of pollution and on (2) processes, procedures, and methods to control pollution from seven specific source categories. One category is, "(A) agricultural and silvicultural activities, including runoff from fields and crops, and forest lands."

It is important to note that in this section the words, "runoff from fields and crop lands," are used along with the words, "nonpoint sources of pollutants." The required 1-year information has been issued treating agricultural runoff as a nonpoint source.

Section 208 provides for the development and implementation of areawide waste treatment management plans. 208(b)(2) of this section reads in part, "Any plan prepared under such process shall include, but not limited to . . ." If you skip to 208(b)(2)(F) you find "a process to (i) identify, if appropriate, agriculturally and silviculturally related nonpoint sources of pollution, including runoff from manure disposal areas, and from land used for livestock and crop production, and (ii) set forth procedures and method (including land use requirements) to control to the extent feasible such sources."

This section is even more specific than 304(e) in that it uses the words "agriculturally and silviculturally related nonpoint sources." It is also important here to note that this refers to state and local areawide planning.

Finally, Section 305(b) covers annual state reports dealing with water quality and water pollution control. 305(b)(1) states in part, "Each state shall prepare and submit to the Administrator by January 1, 1975, and shall bring up to date each year thereafter, a report which shall include . . ." Skipping again, 305(b)(1)(E) states, "a description of the nature and extent of nonpoint sources of pollutants, and recommendations as to the programs which must be undertaken to control each category of such sources, including an estimate of the costs of implementing such programs." 305(b)(2) states, "The Administrator shall transmit such state reports, together with an analysis thereof, to Congress on or before October 1, 1975, and annually thereafter."

Here we have state recommendations for nonpoint source control contained in a state report or more accurately in some 50 state reports. While EPA will provide an analysis, the state reports themselves go to the Congress. This to me is a marvelous opportunity for the states, or shall we say the people, to make their wishes known to the Congress.

There are, of course, a number of other sections of PL 92-500 that have a bearing on the control of nonpoint sources or in the content of this paper, agricultural sediments. However, I believe these are of great importance. They mandate certain actions, but of more importance, I believe they set out goals and lay out the intended program for the control of nonpoint sources. The program that unfolds is:

Federal Information and Guidance (102), (104), (304e)

Cooperative Federal/State/Local Planning (208), (305b)

State and Local Management (106), (208)

The first two elements of the program are under way. Research is being carried forward not only by EPA but by several other federal agencies. The initial 304(e) information has been issued in the form of general reports. Actions have been initiated to develop and issue 304(e) reports dealing with specific aspects of nonpoint sources. Section 208 planning agencies are being designated and states are preparing their initial 305(b) reports.

I would like to turn now to the last element--State and Local Management Programs--which I consider the determinant in water quality improvement. While I have categorized these programs as a separate item, I believe that local expertise must be involved from the very beginning in the planning, development, and implementation of these programs. To illustrate, I would like to briefly cover four items I believe to be extremely important.

First, if a control program for agricultural sediments is to be effective, it must be tailored to local conditions. Rainfall, soil types, topography, crop types, and even legal and institutional structures vary considerably around the country. Who else is more familiar with the conditions of an area but the agriculture and water quality specialists who work daily with that area.

Second, we must determine our priorities and develop and implement an effective control program. I would like to make four points in connection with this item.

1. Adequate assessments of the problems must be made. It is futile to spend money to solve a problem that does not exist. It is just as futile to short change a real problem.

2. Control measures designed to fit the local condition must be planned and implemented to solve the identified water quality problems.

3. The control measures must be cost effective. In other words, it must be insured that we are getting our money's worth in terms of water quality protection.

4. Some means must be established that insures that the needed control measures are systematically applied. Much as it may be distasteful to all of us, this implies the establishment of regulations. Volunteer actions have, and will go a long way. However, unless there is a means to insure that nonvolunteers also put in the control measures where needed, the good water quality we all desire will not materialize.

My third major item rests with a matter of interpretation. I indicated earlier that soil conservation and water quality protection are almost the same thing. However, I think it is important that we recognize there are differences when we get into a specific situation. In most cases, soil conservation measures will be the effective method of preventing agricultural sediments from reaching the water courses. Nevertheless, there are many areas where soil conservation measures are needed for conserving soil but not for water quality protection. It would be a mistake if we fall into the trap of trying to sell any and all soil conservation programs on the basis of water quality protection.

Fourth, I would like to point out that the 208 planning and 305(b) state reports preparation are either on-going or being initiated. Those with the specific knowledge in the control of agricultural sediments should make their expertise available for these efforts. This knowledge and experience cannot only insure the technical reliability of the control programs, but also insure that these control programs are realistic and have hopes of being accomplished.

In summary, let me say we all have a very large job ahead of us. We must recognize that agricultural sediments do affect water quality. We have a national pollution control law that indicates the broad program to control these sediments. Now, we must get about the business, at all levels, of planning, developing, and implementing the control measures and programs that will insure the minimum impact of agricultural sediments on the quality of our waters.

Dr. Hubbard:

Thank you, Chris. There will probably be questions.

Mr. Ronald A. Michieli (American National Cattlemen's Association, Washington, D.C.):

One question comes to my mind in particular on this discussion that Chris had, in what context do you place the recent NRDC-Russell Train lawsuit that the courts ruled in favor of NRDC, and what impact will this have with regard to nonpoint sources? As I understand the ruling, and just an immediate and sketchy runby of the judge's decision on this thing, this does in effect broaden EPA's authority under the point source category. What effect and impact will this have on nonpoint considerations?

Mr. Shilling:

Well, first I don't think we have seen the final opinion or the final order. This I believe is still under preparation. I have read the opinion. I have not analyzed it and I have not discussed it with our legal people yet. So I'm not going to be able to give you a very straightforward answer.

Of course what the judge ruled--for those of you that are not familiar with thing, EPA cut off a permit, put a permit limit at a 1,000 animal units or above and irrigation units at 3,000 acres or above and, I guess, said we were not going to permit storm sewers at this time. I'm not quite sure how silviculture got mixed up with the lawsuit, but it got mixed up in there some way. The opinion of the judge, as I understand it, is that EPA cannot establish these cutoff points, that they have to permit the point sources and cannot establish a cutoff and say above this is the point and above this is not to be permitted.

But the opinion also, as I read it, leaves a number of openings or gives EPA some latitude in, oh, categorizing these things or developing some sort of a program. Now, actually we are not that far along to give you a straight answer on the thing, but I think what we will have to do, one of the things we will have to do, is determine what is point and what is nonpoint; and then the second thing probably will be develop a program which will certainly have to be resource-oriented, I'm sure, in terms not only of EPA but the states who are taking over the permitting program of how fast you are going to proceed down the line to the ones that are point sources. But as I say, the first thing that will probably have to be done is really to determine officially some way or the other what is point and what is nonpoint and then proceed to develop some sort of a program.

As Jerry mentioned earlier, Public Law 92-500--let me back up just a little bit. In the law, point sources are defined, and I have read that definition a number of times, and I really haven't figured out anything that they left out of it. I mean, you know, it is just about everything, really, if we look at it that way. But certainly, realistically, you are not going to go around in this country and try to put a permit on every ditch, you know, crevasse or whatever you have. I mean that's just physically impossible.

But the other problem we have is that nonpoint sources are not defined in the law. All you have is various implications you can draw or deduce from the language of the law what is meant by nonpoint sources. And then secondly, as Jerry mentioned, Public Law 92-500 does not give EPA authority to go out and implement some control on nonpoint sources, not in the same sense that you have with the permitting program for point sources. I mean the states are supposed to take it over, but if the states do not take it over then EPA has to do it. Now, you do not have that sort of authority in the nonpoint source area.

But what it does indicate, as I tried to indicate in my paper, is that under this state planning process and state implementation process and the 208 process or total process, you not only have to have a plan but you have to come up with a management agency that is going to take care of implementing that plan, and I think the implication in the law pretty much is that the nonpoint source controls, the regulations, requirements, implementation will rest with the state and local agencies under that particular process.

I hope I have given you enough but not been too vague.

Mr. Jim Frank (Illinois Environmental Protection Agency, Springfield, Illinois)

From your comments I would surmise that you are going to resign yourself to this opinion and neither yourself nor the joined-in party, as I understand it, the National Livestock Feeders Association, is going to appeal. Or, if that is not correct, are you thinking about legislative relief? And if the answer to both of those is no, I would assume that this does not preclude that less stringent effluent guidelines on the smaller feed lots could be developed by the U.S. EPA so that it may not be quite as bad as what it would appear from face value.

Mr. Shilling:

I will try to take your questions in order, if I can.

I did not mean to indicate that EPA was not going to appeal. I don't know whether they will or will not. There were several intervenors in the case, of course, the State of Washington, the State of Colorado, National Forest Products Association, and several others. I do not know whether it will be appealed or not. As I said, I have not had an opportunity to discuss it with the lawyers in depth or anything along this line.

Now, I was merely trying to answer the question over here, trying to look at the alternatives regardless of whether it's appealed. Certainly I think we will start looking at all those options regardless of what the problem is.

Now, when you are talking in terms of smaller feedlots, at the moment I cannot directly answer that thing, but I don't know whether I see a great big problem. The effluent guideline for the cattle feeding, if you want to put it this way, simply relates to a retention of a 10-year storm or a 25-year storm and adequate disposal of the collected material. Now, then, it gets to be a matter of degree when you get down to the smaller and smaller type of thing. How much change there will be from this I really don't know.

But when you look at it, I mean if you are talking about diversion around the feeding area where some big operator like these hundred-thousand-head outfits might have to have a consulting engineer and a contractor come in and do the work, at least the small operation, the real small operation, can probably do it with a shovel and equipment they have around the farm. They could certainly dig a hole down there at the end of the lot that would trap this stuff, and certainly I'm sure SCS would help with the design of it.

But the object overall is to keep the stuff from running off to the stream directly and getting some adequate disposal of it. You may have a mild period in there where there is some economic type of thing, but it just gets to be a matter of degree of how sophisticated you are going to be about the thing.

Dr. Hubbard:

Time for one more question.

Yes.

Mr. J. H. Ebbinghaus (Farm and Industrial Equipment Institute, Chicago, Illinois)

Could you give some indication of the magnitude of agricultural sediment control; the lack of, I guess, would be the better statement?

And secondly, related to that, what's the highest priority work program that you see in controlling of agricultural sediment?

Mr. Schilling:

The answer to your first question is no. I cannot give you a broad picture. I keep hearing these different--you know, they say that there are 4 million or 4 billion tons or something like this coming off the land, and only a certain portion of this actually gets out into the stream. Certainly a great deal of it does get into the stream. How much of a problem this actually is in terms of the overall nation, no. I cannot give you an answer. We are hopeful that we will get this type of information through all these so-called 50 state reports, if these state reports do come in and address this particular thing. Perhaps someone from the Soil Conservation Service might give you a little better answer in terms of the conservation needs, inventories and things of this nature.

So to answer your first, I cannot give you a direct answer on that, no.

What was the second one?

Mr. Ebbinghaus:

In terms of priority at work, what's the most critical need in the sediment control program?

Mr. Shilling:

Well, I think it's your conservation measures and being sure that these things are applied on a systematic basis. There is no question there has been a great deal done. The soil and conservation districts around the country, the work of the Soil Conservation Service, the Extension Service have accomplished a great deal, yet we still have certain places and certain people that do not have these conservation measures on, and I think that the systematic approach to a conservation measure, whatever the most viable is for that particular farm management unit, is best. Now, it may be no till cropping, it may be terraces, it may be contour farming, or it may be digging a hole down there at the end some place to stop it all, but getting the conservation practices in where they are needed for keeping the stuff out of the creek.

Dr. Hubbard:

One more.

Mr. Min Amemiya (Department of Agronomy, Iowa State University, Ames, Iowa):

I would like to ask Mr. Shilling if EPA has made any effort to promote helping farmers put conservation on the land. Every year we go through budgetary restrictions on cost-sharing programs. If EPA is sincere about putting conservation on the land, what influence can it exert on Congress to get these things on a more permanent basis?

Mr. Shilling:

I'm not sure what influence we could exert. As Jerry answered the question earlier, we have not attempted any legislation ourselves, this type of thing. You do have a program resting over in USDA, and I would say that any support that we would have would be through that type of a program. Now, as to what the future holds in that regard, I cannot answer that question at the moment. I think as the program gels--certainly EPA is going to support the USDA. We have no intention whatsoever of trying to duplicate or replace or anything else the programs that are already existing or trying to duplicate out in the field the structure that SCS Extension Service has. How many people have you got out there, 30,000 or something like that? I have a hard time getting one position much less 30,000 of them. So our support would be through the support of these other programs, at least at the present time. I mean we have no plan at the moment that I know of of creating a different type of a thing or something along this line.

Mr. Amemiya:

My reference wasn't to any competing programs. I'm asking what EPA can do to complement this funding process. It's a frustrating thing for SCS people each year.

Mr. Shilling:

I realize that. It's frustrating to us too.

Mr. Amemiya:

But I think the EPA has monies to get these things done, more than some of the other agencies.

Mr. Shilling:

EPA has a lot of money, but it's in construction of sewage treatment plants, not in these other areas.

Mr. Amemiya:

That's all right, but can't some of these monies be diverted to what we feel is a prime priority in this country?

Mr. Shilling:

I'm not going to comment on that.

Dr. Hubbard:

I think that's a good question, but I don't think anybody here can really answer it.

And so at that point maybe we had better go to the next and last EPA representative.

What we are trying to do as we set up the program is get balanced representation. I don't know how many of you understand the EPA organization. I don't know if anybody anywhere would claim to, but generally speaking we have three EPA segments represented. Jerry represents the regional organization, Chris represents the Office of Water Programs, who to a first approximation are charged with devising planning strategy and that sort of thing. Our next speaker is Dr. Tom Murphy, from the EPA Office of Research and Development. I guess to a first approximation Tom is charged with developing the data base so Chris can do what he needs to do.

Dr. Murphy is a native of Illinois. His undergraduate degree is from Knox College in Galesburg. He started life as a biologist and chemist. He went off to Yale and his M.S. and Ph.D. are in biology from Yale. He spent some time at Glasgow University in Scotland where he studied animal physiology. Not satisfied with that, he decided to go to law school at George Washington University. He served as medical service officer in the Army for 2 years, and since 1967 he has been with the EPA or its predecessor organizations. He is now the Division Director for the Nonpoint Pollution Control Division of the Office of Research and Development.

Dr. Murphy is also one of our sponsors, so clap loud for him.

TECHNICAL BASIS FOR AGRICULTURAL WATER POLLUTION CONTROL

Thomas A. Murphy
Director, Nonpoint Source Pollution Control Division
Office of Research and Development - EPA

Dr. Murphy:

Thanks, Hub.

Now you know why I'm on the program.

I have got to say I learned more about how things really work back home in Illinois and in the Army than I did all those other places.

Gee, I thought by the time I got up here Jerry and Chris would have all the questions answered, but it looks like it's just warming up a little bit.

Of all the water quality problems facing the nation today, pollution from agricultural sources is technically one of the most complex. Not only do the systems by which we produce our food and fiber involve highly complicated living processes, but these processes vary enormously with location. This variation is readily apparent among the major climatic and land resource areas of the nation. However, it can be equally significant on a local scale. The conditions of soil, crop, topography and hydrology and, therefore, the type of pollution controls required, may differ greatly between the fields at the upper fringe of a watershed and those in the bottom but a few miles or 100 yards away.

Even the term "pollutant" is not simple to define as it applies to agricultural sources. Some of the major substances involved, sediment, nutrients and salts, are natural components of the ecosystem which become "pollutants" only when they exceed levels which impair water quality or beneficial uses of our waters.

Nor are these substances discharged in a continuous, easily predicted manner. Usually their discharge is the result of rainfall or snowmelt and runoff, which are processes which can be dealt with only in terms of probabilities and, therefore, can be predicted with only limited accuracy. Since these discharges are intermittent and often diffuse, there is usually no distinct effluent which can be easily collected or monitored for its volume and content of pollutants. This means that in most cases it is not feasible to measure directly the pollution load, which is one of the most essential pieces of information needed for environmental management purposes. Because of this, we are forced to use less direct means for assessing the contribution to water pollution of agricultural sources and for determining the effectiveness of methods for controlling this impact.

In dealing with a problem as complex as water pollution from agriculture, it is very tempting either to make the problem more understandable by trying to reduce it to a few generalizations or to bog down completely in its details and diversity.

Oversimplification is apparent in attempts to come to broad conclusions, such as equating agricultural water pollution control with erosion control or in efforts to press for general solutions such as the application of uniform control practices over broad areas, such as an entire state. Unfortunately, agricultural pollution problems are too diverse and complex to be solved by simple, uniform remedies.

The other extreme is to overcomplicate the problem by unduly emphasizing its complexity and the uncertainties of its solution. This appears in pleas to do nothing until we fully understand the nature of the pollution problem and can fully justify the means for its control. The fallacy of this approach is in the degree and precision of technical information which is demanded before action can be taken.

Let's face it--many, if not most, of the important decisions we make in our personal, public, and business activities are based on far less information or certainty than we would like to have. Usually, the degree of certainty required for a decision is related to the severity of the problem, the benefits from its solution, and the cost and time required to obtain more information.

With regard to agricultural pollution control, one of the key public decisions we face is what level of technical information is needed to justify action. No doubt, those who will pay the cost of control will demand more technical data, and those who don't pay, will demand less.

What I would like to discuss today is how these decisions are likely to be made and what technical information will be needed upon which to base them.

It seems to me that the decision-maker will need the answers to six basic questions:

1. How much of the pollutant or potential pollutant leaves the site where it is generated?

2. How much of the pollutant reaches a location where it degrades water quality or results in some other environmental damage?

3. How much water quality degradation or damage occurs as a result of this exposure level?

4. What options are available for reducing the pollutant load from the source, and what is their relative cost and effectiveness?

5. How feasible is the implementation of these control options?

6. Are the benefits resulting from control worth the cost?

It is all but the last cost/benefit question, which can be solved only through the political process, that we must deal with from a technical standpoint. We must also consider who this decision-maker will be and when he will be making these decisions. In this regard, it is clearly the intent of EPA's current policy that these decisions be made on a state and local level. It is also clear, if we are to carry out the mandate of the Federal Water Pollution Control Act, that these decisions will have to be made during the next 5 to 6 years.

Where do we stand today in our ability to answer these questions, and what is the probability that we will have adequate answers available when they are needed?

1. Measuring source loads: As I mentioned earlier, the problem here is one of the lack of an effluent which can be easily or economically measured. This means that in most areas, we need techniques for measuring something which can be measured, such as soil type, rainfall pattern, cropping procedures, etc., and from these measurements be able to predict the resulting load of pollutants on the nearest body of water. Currently, for some substances, such as sediment, we know a great deal about what leaves the source, but considerably less about predicting how much reaches the nearest stream. Similarly with other substances, such as nutrients or pesticides, most of our available data also relates to what leaves the source rather than what reaches the watercourse.

As with most of these questions, we at EPA are approaching this question in two phases. The first phase is to compile, evaluate and publish what is known now in order to make the current knowledge base widely available, and to stimulate and open discussion of its adequacy and utility. For source loading data, an initial effort is being conducted for us by Midwest Research Institute as the first step of a project on the "National Assessment of Water Pollution from Nonpoint Sources." This consists of a manual of loading factors or functions based on available data for all nonpoint sources, including agriculture. We currently have a draft of this manual under review and expect it to be published sometime this summer.

The second phase, which is also underway, is the development of more sophisticated loading functions or models which will become available for general use during the period of 1977 to 1980. Most of these are being developed jointly with other federal agencies. Included are:

a. A model for determining salt loads from irrigated agriculture in the Colorado River Basin being developed in cooperation with the Bureau of Reclamation.

b. A cropland runoff model for nutrients and pesticides being developed for four major crop regions of the country in cooperation with the Agricultural Research Service.

c. An initial determination of the feasibility of developing a runoff model for silvicultural activities in cooperation with the Forest Service.

2. Measuring pollutant delivery and damage: This is the problem of determining how much of a pollutant gets to a place where it will do no harm and how much damage results. Technically this is probably the most critical problem we face and the one for which useful answers are most difficult to obtain. It is complicated by the fact that many of the substances we have to deal with, such as sediment, nutrients and salts, are natural substances and become pollutants only when in excess of acceptable levels. Moreover, the damages resulting from agricultural pollution depend greatly upon what type of body of water is being impacted.

The dilemma we face is the enormous complexity and diversity of biological systems. To understand fully the dynamics of all types of waters in all parts of the country is clearly beyond our current means and the time available, and may not be worth the cost. This problem is a critical one for determining what level of technical information is adequate for decision-making. We do have some very useful information on sediment damages and on acceptable levels of nutrient enrichment in nonflowing waters. However, we need a clearly defined set of measures for decision-making at the local level. One option we are just beginning to examine is the possibility of determining background levels of natural substances such as sediment and nutrients in our waters as a measure of acceptable levels. This might constitute for nonpoint sources a more realistic reference point than the often confusing concept of "no discharge." How one defines and measures "background" is not straightforward. However, if it can be done, the concept may have utility in helping to determine acceptable pollutants levels and consequently, how far we have to go with agricultural pollution control.

3. Cost and effectiveness of source controls: In this area, we face the interesting dilemma of knowing a large number of control options, but not having very much information on their effectiveness in terms of overall water quality improvement. For instance, there are indications that soil erosion measures such as no-till farming practices could significantly reduce the pollution load from cropland. However, we do not know with accuracy how much this load would be reduced under most conditions. Moreover, we have not yet adequately assessed the significance of possible environmental side effects from these measures, such as increased infiltration to groundwater or impacts from the increased use of herbicides.

Recent experience with such issues as the catalytic converter for automobile exhausts and past experience with such issues as phosphates in detergents is teaching us that these decisions can involve very difficult and complex environmental tradeoffs.

We believe that our initial emphasis should be directed not so much to the development of new control options but to the evaluation of the cost/effectiveness of controls that are now available. It seems prudent in doing so to capitalize on current knowledge. For instance, if we could relate water quality impact to average annual soil loss we could tap the vast base of knowledge on soil conservation techniques.

Our approach to this area at EPA is varied, but it is aimed both at immediate compilation of known data and longer term demonstrations of cost/effective source management methods. One near-term effort I'd like to mention is a manual on management of pollution from agricultural chemicals, nutrients, and sediments being prepared for us by the Agricultural Research Service.

This manual, which is keyed to land resource areas, is a guide to selection of agricultural pollution management systems for either a farm or a drainage area. It does not specify what has to be done. What it does do is to describe what data are needed, how and where to get the data, and how to use these data in estimating both pollutant loads and the effectiveness and costs of available controls. The document is aimed at the state and local environmental regulatory official and is not intended to supplant existing information or data, or to discharge the use of local agricultural expertise, where appropriate. Rather, it is intended to guide the regulatory official in making use of available agricultural information and expertise. We are very interested in determining both the utility of this document in providing helpful information and the effectiveness of the format in order to guide us in future efforts. Current plans are for publication this summer.

4. Implementation of controls: Sometimes knowing technical solutions to problems is not enough. An example of this occurs with the management of salinity in irrigation return flows from agriculture in the Colorado River Basin. We are rapidly coming to the conclusion that water management methods which involve a substantial reduction of water use while maintaining current crop production will prove to be a very cost effective control measure for salinity. However, the implementation of appropriate practices is severely inhibited by existing laws, institutions and traditions. How to overcome these constraints is not clear at this time.

Assuming we know what needs to be done, how do we go about getting the controls implemented? Certainly changing the way a farmer farms is a far more complicated matter than requiring the installation of a treatment system at the end of a pipe by an industry or municipality. It seems clear to me that our experience with education and persuasion is such that the probability is sufficiently high to conclude that some degree of regulation may be required in some areas to achieve water quality goals.

A major problem in regulating nonpoint sources is the lack of a defined effluent to measure. With point sources the quality of the effluent, or the pollution load, can be specified as a measure of performance for control systems. By specifying only performance, freedom is provided to select the control system appropriate to the specific source. However, for agricultural sources there is no distinct effluent which can be regulated and monitored for compliance. Therefore, the source activities or practices themselves must be regulated. Because of this, it has been suggested that some basic set of common practices be applied to agricultural sources, as a rough equivalent of Best Practicable Treatment for point sources. This concept can be seriously misleading. Agricultural conditions and water quality requirements vary with location to the extent that I feel it is impractical to attempt to apply uniform practices over large areas. I think the key to understanding this concept is to realize that although the farming practices may in some cases have to be regulated, they will not likely be prescribed by a regulatory agency. Let me try to explain how I see this process working, as described in the following sequence:

a. An initial determination would be made in a drainage area, possibly to the level of the farm, of an environmental source performance level, such as the maximum soil loss rate or comparable measures;

b. A set of practices would then be developed, presumably by the farmer or some local unit such as a Soil and Water Conservation District, assisted by local experts. These practices would be specifically tailored to the conditions of each area or farm to meet the specified performance level, and hopefully would be consistent with an overall land management plan for the area;

c. This specific set of practices for each area or farm would be reviewed and approved by the appropriate regulatory agency; and finally;

d. The approved practices would then be monitored and enforced.

Thus, the practices are regulated, but not specified by the regulatory agency, and considerable leeway is allowed for tailoring controls to local conditions. For such a system to work at the local level there is a critical need for technical guidelines which relate control practices to pollutant loading or performance levels.

Conclusions

From this analysis we can see that the technical aspects of agricultural pollution control are complex indeed. Our challenge in providing the technical base for these critical decisions is made more difficult by the pressure of time. With the lead time required for this type of research, we literally have to decide now and commit ourselves to the work needed to produce results 3 to 5 years from now. The key to doing this effectively is to understand, as best we can, what technical information the decision-maker will need. I hope this Conference can substantially assist us in this understanding.

Dr. Hubbard:

Thank you, Tom.

Questions? Yes.

Mr. Dwight Hamilton (National Association of Wheat Growers, Olney, Texas):

I would like to know how much input farmers are having in the decisions that are being made by EPA.

Dr. Murphy:

I'm going to have to--and Dr. Hubbard tried to explain EPA's organization and did probably as good a job as anybody--say, as I have often told my colleagues in USDA, I'll explain EPA's way of doing business if they will tell me how USDA does it.

I can't answer that from a policy standpoint. Maybe Jerry and Chris can help out there. From a technical standpoint, which is my area of responsibility, we are trying to work very closely with the agricultural community. Now, the agricultural community is not a simple or uncomplex group of people.

The way we tried it, and this is sort of an example of how we are trying to do it, in this user's manual, is we went over to USDA, our sister federal agency, and said, look, we want to work with the agricultural community in developing the technical base on which these decisions would be made; our hope is not in telling the farmer what to do but in giving him the technical information to make those decisions, so that the state water pollution official and the county extension agent and the SCS man all tell him the same technical information, so he has a common base. And we said, how can we do this?

And the way we decided was to set up essentially a working group within USDA spearheaded by ARS, but with involvement from the Extension Service, cooperative state research service, and the people involved in these areas to put together this national manual, which is a manual that tells you what data you need, how to use these data in making the decisions on sediment, nutrients and chemicals from cropland.

Now, where this stands right now is we have a draft in hand that is being revised by a number of state extension groups; it's being revised by ARS groups around the country, by SCS, and so forth. Our problem is, working on agricultural research, we have got about 25 people. ARS alone has 8,000 or so. And there are so many people we can talk with in a day. We felt with these limitations, the most effective way to go is through our sister agency to the farmer.

And I think that's the best explanation I can give you right now. If you have got some suggestions on how we can do it within the resources we have got available, I would sure appreciate it. We want to do it in as open a way as possible, and I am speaking right now of just developing the technical use, and we will, I think you will find, cooperate with you to the extent of our time and ability.

Dr. Hubbard:

Jerry, do you have a comment?

Mr. Svore:

No. I just wanted to add a little bit to what Tom said.

There is another way, incidentally, that the farmer has a lot to say as to what EPA's policies and regulations are. I think a good example is the feedlot regs when they first came out. When they were published in the Federal Register there was a lot of response to that and EPA did listen. Now, we have a court case which we lost, and I am not so sure that we probably weren't closer to what the interpretation of the court case was the first go-around.

But the point is, there is an opportunity to take a crack at the regs when they are published in the Federal Register, and we have proven in the past that we do listen to that.

Dr. Hubbard:

Time for one more question.

Yes.

Mr. Dick Amerman:

You refer to the fact that there are no effluents to measure, and so forth. You must mean that there are so many farm boundaries and so many streams that you can't do it exactly.

Dr. Murphy:

Yes.

Mr. Amerman:

But your programs which will be developed locally must also have some sort of a guideline for the local people to get out and spot-check the adequacy of their programs; is this true?

Dr. Murphy:

Yes. I didn't mean to say there is no effluent. You know, you could go out and measure what comes off the draw of every cornfield, if you wanted to, it would be very complex, and when you are dealing with these probability rainfall events you have got to be there at the right time. If you are 2 min late you may miss 90% of the load going down.

What I meant to say is I think it's economically technically impractical to deal with the effluent, and I think what you need is to establish defined relationships between something you can measure. In other words, this practice is within a certain probability range likely to reduce the loading in nutrient or sediment in this area by this much and establish these general relationships and then apply the practice and monitor the practice itself.

Now, of course you have to have some overall base in water quality monitoring to verify that your predictive relationships are really valid, but I think there's no other way to go because it's just too complex and too expensive to try to get out there at the right time and get the right measurement. A sampling station for a rainfall event is a very expensive and very complicated device, and there is just no way I can see this could be applied generally.

Does that answer your question?

Mr. Amerman:

Well, I suppose part of it is at what level do you expect to do your model checking to verify your model? Do you expect the local units to do this, do you expect the state level to do it, or the regional office?

Dr. Murphy:

It's probably going to have to be done at several levels. You know, the difficulty is, if you develop some sort of data on how much practice, say terracing, or something, to reduce loading of nutrients, how broad an area is that applicable to? Do we need data on every watershed around the country? We can't do that either, so we are going to have to do it within a probability range.

Now, at the federal level we will try to do it by major areas. It will probably have to be a combined effort at the state and local effort to optimize these to the local conditions. There is no way we could do it here. And there are a lot of people out there in the agricultural community who have the capability for doing this. What we are trying to do is put a little pressure on them from the federal level to join us in this effort. It has got to be both of us.

Dr. Hubbard:

There will be an opportunity this afternoon in the panel discussion for more questions. You will be here, will you not, Tom?

Dr. Murphy:

Right.

Dr. Hubbard:

So let's adjourn now for coffee. We are only 1 min behind schedule. When you come back in, do not be shy about the front row. There are chairs up here. We have too many people crowded in the back.

We will resume in 15 min.

- COFFEE BREAK -

Dr. Hubbard:

The Environmental Protection Agency had their inning and now we are going to shift keys a little bit. It seemed to me there were several themes that ran consistently through the statements this morning. One was the close interrelationship between environmental concerns and soil conservation. Another that seemed to come up was the mismatch, so to speak, between the resources and people and dollars available to the EPA and the much larger organization and resources, so the EPA people said, and I believe it, that the Agriculture Department and the Soil Conservation people have. So the soil conservation establishment gets the next inning.

The first speaker is David Unger, Executive Secretary of the National Association of Conservation Districts. We have been working across the country, you know. We started out with a sociologist from California, then we moved to a sanitary engineer from Kansas and North Dakota, we dropped down to Texas for a livestock expert, we picked up a biologist from Illinois, and now we are shifting to Pennsylvania.

David Unger, who has been with the National Association of Conservation Districts since 1964, was Director of the Pennsylvania State Soil and Water Conservation Commission and he helped organize some 32 new soil and water conservation districts in that state. He's a good bridge because he's a Michigan native. He went to college in Ohio, then he moved to study in Political Science and Public Administration at the University of Pennsylvania and Harvard University.

The topic of Dave's talk is Conservation Districts and Pollution Control.

Dave Unger.

CONSERVATION DISTRICTS AND POLLUTION CONTROL

David G. Unger
Executive Secretary
National Association of Conservation Districts

Mr. Unger:

Thank you.

I would be less than honest if I didn't say I stand here with some reluctance because of the difficulty and complexity of the subject that we are dealing with this morning. I'm reminded of the time when Johnny woke up and decided he didn't want to go to school and told his mother. She said, "Johnny, you have got to go to school." And he said, "I don't want to go to school."

He said, "The building is in terrible shape, the kids are fighting in the halls, the walls need painting, nobody likes me, the students don't like me, the teachers don't like me, the janitor doesn't like me, and I don't want to go to school today."

And his mother said, "Johnny, you have got to go to school. You're the principal."

It is fair to say, I believe, that we would not be discussing the problem of agriculture and clean water at this Conference had not the Congress responded to widespread concern over the state of the environment by enacting the Water Pollution Control Act Amendments of 1972. Yet, in at least one aspect of this total concern, we have come full circle.

It was 40 years ago that the Congress enacted another law that set in motion a vast program dealing with environmental quality. This was Public Law 46 of the 74th Congress, and it was declared national policy to "provide permanently for the control and prevention of soil erosion and thereby to preserve natural resources, control floods, prevent impairment of reservoirs, and maintain the navigability of rivers and harbors (and) protect public health. . ."

That law established the Soil Conservation Service, and the problems faced by that agency in dealing with erosion on millions of farms and ranches throughout the country eventually led the states to enact laws under which a network of 3,000 local soil conservation districts was created.

These districts, managed by 17,000 elected and appointed officials, are the members of our Association. Their work has been concentrated on the prevention of erosion, preservation of the soil, better management of land and water, and wise use of land and its resources. They have promoted the concept of soil conservation as a public duty as well as a sensible business practice. They have aided farmers and ranchers by coordinating technical, financial, research, and other services available from cooperating agencies.

The districts have relied on scientific conservation planning as a foundation for this effort, and this approach has been maintained as their work has gone beyond simply saving soil to more sophisticated programs in watershed management, flood prevention, recreation enterprises, economic development, and assistance to towns and suburban communities.

The program is a successful one, and it has been conducted wholly on a voluntary basis.

In recent years, however, there has been a tendency to look at the consequences of soil erosion, and related problems, from a different vantage point. Increasingly, the runoff that leaves farms and ranches has been viewed as a pollution problem, and the detached soil, along with nutrients, pesticides, and other chemicals, have been considered from the water quality standpoing--rather than solely as evidence of poor land management that degrades an essential resource at the source.

Our districts, charged by state law with the control and prevention of soil erosion, have been naturally concerned most with the role of sediment as a pollutant. They have noted that despite progress that has been made, some 4 billion tons of soil materials are washed into tributary streams each year. They have studied research reports which indicate that at least half of the total sediment delivery originates from agricultural lands, with the rest coming from forests and associated rangelands, streambank erosion, construction sites, roadbanks, surface-mined areas, and geological erosion.

Sediment has been one of the last pollutants to be recognized as such. It is, of course, a widespread problem and most difficult to deal with. And the nation has concentrated its greatest efforts, and rightly so, on sources of pollution that can be more easily controlled and which have more clearly defined health hazards.

As the importance of sediment control has come to be recognized in this more recent context, our member conservation districts have aided in a number of approaches to the problem. Several years ago, it became evident that it would be useful to respond on a national basis to the actions being taken locally and in the states. Among the developments that NACD participated in actively were these:

First, a National Conference on Sediment Control in the fall of 1969: We sponsored this in cooperation with the National Association of Counties and the Soil Conservation Society of America. The Federal Water Pollution Control Administration, the Department of Housing and Urban Development, and the Department of Agriculture cooperated.

One of our objectives at that time was to create an understanding of sediment as a water pollutant. We were pleased when Senator Jennings Randolph of West Virginia, our keynote speaker and Chairman of the Senate Public Works Committee, described sediment not only as a pollutant but as the "world's greatest pollutant" in terms of volume. The proceedings of this conference, published by HUD, and the conference's working paper, published by the National Association of Counties, remain valuable sources of information today.

Second, the Symposium on Environmental Legislation held in 1972 by the Council of State Governments and the Environmental Protection Agency. NACD participated actively in the soil erosion workshop of this symposium which resulted in a recommendation that responsibility for an erosion and sediment control regulatory program be placed in the conservation districts and that suggested legislation be drafted along these lines in the form of an amendment to district enabling laws.

Third, the development of suggested state legislation: A task force was established, with membership from conservation districts, state government, the Department of agriculture, and the Environmental Protection Agency to draft such a model erosion and sediment control act. Mr. Dale Cochran, one of the speakers this afternoon, served as chairman of this task force. The act was approved by the Council of State Governments and distributed to the states in their volume of 1973 Suggested State Legislation.

And fourth, the sponsorship of a series of state sediment control institutes (see Table I): With financial support from EPA, our Association conducted a series of over 40 state conferences, many held as governors' conferences, on this subject. The emphasis was on communication with the individuals and interests most directly concerned, such as farmers, ranchers, builders, developers, planners, state legislators, foresters, county and municipal officials, soil conservationists, environmentalists, and representatives of local, state, and federal agencies. Our state associations of conservation districts and the state soil and water conservation commissions and departments were key participants in these sessions.

We had several major purposes in mind. First to awaken, or perhaps we should say reawaken, interest in the matter of erosion and sediment control. Second, to report on what has been done in Maryland, Pennsylvania, Iowa, the Virgin Islands, and other jurisdictions to cope with the problem. Third, to consider the use of regulatory as well as educational and incentive approaches. Fourth, to consider the provisions of the model act referred to above. And finally, the most importantly, to encourage the states to take action in this field, especially in view of the processes set in motion by PL 92-500.

TABLE I

STATE SEDIMENT CONTROL INSTITUTE DATES AND STATUS OF STATE LEGISLATION

State	Institute Date	Proceedings	Law Drafted	Law Introduced	Law Enacted
Alabama	12/9/74				
Alaska	4/11/74				
Arizona	-				
Arkansas	-		X		
California	5/8-9/74	X			
Colorado*	9/13-14/73	X			
Connecticut*	5/31/73	X	X		
Delaware	-		X	X	
Florida	-				
Georgia*	7/22-24/73	X	X	X	
Hawaii[1/]	5/14-18/73		X	X	X
Idaho*	1/22-23/73	X	X	X	
Illinois	7/28-30/74		X	X	
Indiana*	12/2-4/73				
Iowa	-		X	X	X
Kansas*	8/28-29/72	X	X		
Kentucky	1/25-26/73				
Louisiana	12/15-16/72	X	X	X	5/
Maine*	7/16/74				
Maryland[2/]	10/17/73; 10/3/74	X	X	X	X
Massachusetts*	10/9/74				
Michigan	-		X	X	X
Minnesota*	11/30-12/1/72	X	X	X	
Mississippi*	9/18/73		X	X	
Missouri	12/13-14/73	X			
Montana	12/15/72	X	X	X	
Nebraska	12/12-13/73	X	X		
Nevada	11/29/73	X			

TABLE I (Concluded)

State	Institute Date	Proceedings	Law Drafted	Law Introduced	Law Enacted
New Hampshire*	10/10/74				
New Jersey	3/75		X	X	
New Mexico*	3/22/74				
New York	12/10/74	X	X	X	
North Carolina*	4/24/74	X	X	X	X
North Dakota	1/17-18/73	X	X	X	
Ohio	-		X	X	X
Oklahoma*	9/12/72				
Oregon	12/11-12/72	X	X	X	
Pennsylvania3/			X	X	X
Rhode Island	10/30/74	X			
South Carolina	9/18/74		X	X	X
South Dakota*	3/26-27/73		X	X	
Tennessee	7/24-25/74				
Texas	-				
Utah*	3/28-29/74				
Vermont*2/	2/28/74; 7/18/74	X			
Virginia	-		X	X	X
Washington4/	11/27/73		X		
West Virginia	12/12-13/72	X	X	X	
Wisconsin*	4/26-27/73		X	X	
Wyoming*	5/29-30/73				
Puerto Rico	7/26/74				
Virgin Islands	-		X	X	X

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* Governor's conference.

1/ Four institutes held. 2/ Two institutes held. 3/ Held by Pennsylvania Department of Environmental Resources. 4/ Preliminary conference. 5/ Governor's Executive Order assigns sediment control responsibility to conservation districts.

It will be obvious to all familiar with the conservation district program that the issue of a regulatory approach was of tremendous interest to the institute participants. Many did not realize the extent to which such programs had already been developed, first by town, city, and county governments, and later by state governments. In most of these cases, which primarily dealt with controlling sediment resulting from the construction of homes, shopping centers, highways, and other facilities, conservation districts had been instrumental in the development of the programs and had responsibilities in connection with them.

Institute participants were also intensely interested in the newer laws enacted in Iowa, the Virgin Islands, Pennsylvania, Ohio, and later--Hawaii--that provided for the control of sediment originating from agricultural as well as other lands.

The question of whether regulation is necessary to achieve goals in this area is important. Those who favor regulation raise the questions:

-- What are the prospects for dealing adequately with prevention of erosion on agricultural lands? A great deal remains to be done and only a regulatory program will provide the necessary acceleration.

-- Do changing farming practices and ownership patterns require a different approach? Is the ethic of soil stewardship and voluntary use of soil-conserving practices adequate in today's highly organized agri-business context?

-- How can voluntary compliance in the agricultural sector be squared with mandatory standards in the construction and development fields? Is it fair to expect some to comply by law, and others not?

-- How can the nation deal with the potentials for extraordinary erosion hazards, such as those that are created during times of expansion of agricultural production? Erosion reached 20 to 30 tons per acre per year in some sections of the cornbelt last year, and 50 to 200 tons per acre in parts of the western high plains.

-- And finally, isn't it clear that some kind of regulatory program for nonpoint source pollution control--including sediment control--is a foregone conclusion in view of the requirements of PL 92-500?

At this point in our institutes, we discussed the model act. This draft bill, prepared for the purpose of stimulating discussion, combined many of the features of state laws existing at the time. Let me review its features briefly.

It calls for control of sediment originating from all land-disturbing activities--agricultural, forestry, and construction. It calls for a state sediment control program and guidelines to be developed by the state soil and water conservation commission or department, and local program and guidelines to be developed by conservation districts. There are provisions for the cooperation of the state water pollution control agency and for public hearings. There are provisions for inspection and enforcement and for funding of the program.

The basis of the model act is that prevention is the key to solution of the problem. Conservation plans, approved by the local districts, are required for all land-disturbing activities. They must be implemented in order for landowners to comply with the act. The plans, based on standards established by the district, would call for those measures--management, vegetative, and structural--that are needed to hold erosion and consequent sedimentation within reasonable limits.

What has this educational program achieved? Most importantly, we believe, a new awareness of the extent of the problem. The information presented and the discussions that took place have helped enormously to achieve a greater realization of what is at stake in preventing erosion and sediment damages.

A second major consequence has been to energize leadership and action. In almost every case, active follow-up has resulted from the institutes. Task forces have been formed to study the problem, and programs to deal with the problem are being formulated.

A third benefit has been the exchange of information between many individuals and organizations that had not been aware of the others' programs and interests.

Finally, and more concretely, five additional state laws in this field were enacted during the period while the institutes were in progress, and about 15 additional laws have been drafted for introduction in state legislatures. One governor issued an Executive Order dealing with the matter.

At the conclusion of the institutes, we made several recommendations based on what we had learned. These are:

1. Continue to place emphasis on the preventive approach in dealing with sediment and related nonpoint source pollutants.

2. Continue to utilize the Model State Act for Erosion and Sediment Control of the Council of State Governments as an educational tool in the discussion of the principles of regulatory programs for sediment control.

3. Cooperate with concerned organizations in the preparation, evaluation, and dissemination to the states of additional legislative and program implementation materials deemed adequate to meet the objectives of PL 92-500 that are directly related to sediment control.

4. Exert every effort to encourage close cooperation between state water pollution control officials, state soil and water conservation agency leaders, conservation district officials, and the heads of other concerned state agencies in the development of nonpoint source control programs in connection with Sections 305(b), 208, 304, and other provisions of PL 92-500.

5. Cooperate with concerned organizations in the preparation and utilization of effective training materials and programs to aid in the development and implementation of state and local erosion and sediment control programs.

6. Cooperate in research, education, and demonstration programs related to erosion and sediment control and related nonpoint source pollution abatement.

The report on these institutes is being published by EPA and will be available soon, and I have attached to this paper a summary of the salient facts about the institutes and consequent legislative action.

There are many unanswered questions in this field. The states, which are now preparing reports to EPA on nonpoint pollution and proposed solutions will find the task to be extremely difficult. The enormous scope of this problem, dealing with hundreds of millions of acres of land, escapes many people who are concerned about water pollution. Yet substantial progress has been made, and will continue to be made.

There are some matters that need further attention at this time, in our opinion, in developing sediment and related pollution control programs, in implementing existing programs, and in carrying out educational work.

1. Getting expertise and authority together: Those with experience in sediment control and those with regulatory or advisor responsibilities need to consult with each other thoroughly. There are many gaps in communications that need to be bridged at every level of government and between levels.

2. Delineation of opportunities for acceleration of existing voluntary approaches as well as consideration of mandatory programs: In some cases, decisions to use regulatory approaches are made without full recognition of what might be done by accelerating existing educational, technical assistance, incentive, and other noncompulsory techniques. It is significant, in our view, that there are substantial backlogs of requests for technical and cost-sharing assistance under present voluntary conservation programs. And there are authorities for accelerating land treatment under long-term contracts that have simply not been funded or implemented. Furthermore, it is curious that at the very time that there is a greater perceived need for erosion prevention and sediment control, the professional staff of the key agency in this field--the Soil Conservation Service--has been progressively and sharply reduced.

3. Assignment of priorities: It became evident to us in the progress of the institutes that additional information on the severity and sources of sediment problems is needed so that priorities can be established.

4. Integration of sediment control programs with related nonpoint source programs: There are significant interrelationships between sediment control, the control of watershed runoff, and the control of nutrient and chemical runoff.

5. Money and manpower: In our view, no effective program in this field can be carried out without meeting manpower and funding needs for administration, technical assistance, training, enforcement, and, in some cases, cost-sharing.

As I said in the beginning, we have come full circle in 40 years. In the 1930's, we made a national commitment to the prevention of erosion in order that all could benefit from the land. Today, a new environmental consciousness demands a similar commitment in the interests of cleaner air and water, healthier streams, better recreation, and improved fish and wildlife habitat.

The nation's conservation districts stand ready to do their share in this total effort.

Thank you very much.

Dr. Hubbard:

Are there questions for Mr. Unger?

Yes.

Mr. Oren Long (Environmental Protection Agency, Region VII):

In response to a recent poll taken by Representative John Vogel of Lawrence, Kansas, on how conservation district supervisors feel about the proposed Kansas erosion control legislation, one supervisor replied, "The situation in farming is desperate with energy shortages, unfavorable weather conditions and inflated prices all pressing the operator. Conservation may soon go out the window in a do-or-die existence in farming. For example, the trend toward larger farm equipment is in no way compatible with soil saving and conservation. Most operators with big equipment are farming up and over existing terraces or around the quarter section the simple way in an attempt to cut costs. Also, speed is important in today's agriculture, but speed is another enemy of the soil, creating the fine texture that adds to all types of erosion."

Question: Would you please comment on this supervisor's suggestion that some conflicts exist between current trends in agricultural economics and conservation at the farm level? And if you agree that some conflicts do exist, do you think erosion control regulations can help resolve these conflicts, or will such regulations impede progress toward an expanded food-producing capability?

Mr. Unger:

Well first of all, I think it's obvious as technology changes, as agricultural practices change, in view of the economics of the situation and new developments, that we are going to have to keep up with the kinds of conservation measures and practices that will meet environmental goals properly. I think that the history of the work of the soil conservation movement has been one of trying to adapt to technological change as it occurs and to find those practices that will continue to conserve soil and water and meet the new technological developments.

But obviously, too, it's possible for technology to outstrip some of this effort, and there has to be a constant readjustment that goes on in the development of the right kinds of technical practices.

The second part, as far as whether erosion and sediment control regulations are going to impede progress, is that your point, Oren? And I knew you would come up with some kind of a nasty question.

If the regulations are not practical, if they are not designed with reason in mind, if they don't accord with the technological development, certainly there would be problems. I think that the point is that we need to have, if we are going to have regulations, if a state, if a district, if a county, if a locality decides that it wants to have a regulatory approach, it's going to have to make sure that those regulations are going to meet the problem and not exacerbate it.

Dr. Hubbard:

Yes, sir.

Mr. Rex E. Jones (Indiana State Board of Health, Water Pollution Control, Indianapolis, Indiana):

I think that enforcement is probably a big problem here with the local soil and water conservation districts. Have you had any or do you have any feedback from some of the states who have implemented these programs? And if so, what is it?

Mr. Unger:

Obviously because districts have based their entire approach on a voluntary program over the years, they have been reluctant in many, many cases to be involved in the enforcement of regulatory programs once they have been established, even in some cases when they have led in the legislative and other work to create the regulatory program itself.

I think an interesting case is in Pennsylvania, which has gone quite far in developing its plans for erosion control on agricultural as well as other lands. When they began, the way in which the state program has developed gives the option to the local conservation district to take either a certain number of steps in terms of planning and approving the conservation plan, or going farther and actually taking over enforcement of the program beyond that first level; and many, many districts have been involved in the first set of these responsibilities, and there were very few to begin with that wanted to have anything to do with the enforcement responsibility.

But just in the past several months the reports are that an increasing number of districts have requested and have been given the enforcement power because they want to be involved in the program from beginning to end. They feel that they can do a better job, and it will be a more consistent program.

So I'm not saying that by any means conservation district officials around this country are eager to get into the enforcement of sediment control regulations. Where this has been going forward they have shown some signs of adjusting to this in some cases. I'm sure there are other states where this would not be the case.

Mr. Jones:

Does the NACD then go along with that?

Mr. Unger:

The NACD's position is that the state and the districts are going to have to decide what they need to do to accomplish their goals of sediment and erosion control state by state and district by district. If this can be done by acceleration of voluntary programs, more technical help, education, incentives such as have been mentioned here earlier by Min Amemiya, and other work of this kind, fine. If they decide they want a regulatory program, why, that's fine too. Our major concern is that conservation districts be a part of whatever kind of program that's developed because this is their responsibility under state law.

Dr. Hubbard:

Thank you, Dave.

The next speaker, Mel Davis, who is Assistant Administrator of the USDA Soil Conservation Service, may--depending on what program you have seen, you may have Kenneth Grant in that slot. Mr. Grant several weeks ago said he would be unable to make the commitment and he asked Mel Davis, as the best qualified alternate, to come in his place. We are glad to have him here today.

He has been Assistant Administrator of the Agricultural Soil Conservation Service since April of 1974. He's another bridge. He grew up in North Dakota. There seem to be a lot of those kind of people here today. He moved to Pennsylvania in 1963 as Assistant State Conservationist, and he and Mr. Unger were associated there.

In 1972 he became Director of the SCS Technical Service Center in Upper Darby, Pennsylvania. I thought Upper Darby was all rich suburbanites. I didn't know they had any agriculturists around there. He is responsible for legislative liaison and for program planning.

Mel Davis.

SOIL CONSERVATION AND POLLUTION CONTROL

R. M. Davis
Assistant Administrator
Soil Conservation Service - USDA

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Mr. Davis:

Thank you, Hub. And good morning, ladies and gentlemen.

First I should make it perfectly clear--and that's not a phrase anybody from Washington should be using any more--that the administrator did not come because you had him listed in your program as the acting administrator. That didn't offend him. The reason he is not here, he is just recently recuperating from a gall bladder operation that he underwent just 3 weeks ago. He did appear back in the office on Monday morning and is on the way back to good health or perhaps I should even say better health than what he has been in for the past several months when he has had this particular affliction.

The topic assigned to Mr. Grant and the one I will use is "Soil Conservation: Pollution Control," and I will talk about this, of course, primarily from the viewpoint of the Soil Conservation Service, but more broadly the United States Department of Agriculture in total. I hope, Hub, when I get through that you will not allude to me as one of the bureaucrats who are part of the problem in Washington, but, rather, one that could be part of the solution to the problem that we talk about today.

I'm happy to join Dave Unger on the program and to further relate pollution control efforts to the soil and water programs that conservation districts help put on the land.

First, soil and water conservation is pollution control.

Sediment is the nation's largest water pollutant by volume. Adsorbed on sediment particles or in solution with them in runoff water are a number of plant nutrients, agricultural chemicals, waste materials, and harmful pathogens that materially affect water quality. Soil and water conservation practices, in controlling the flow of water across rural and urban land, reduce soil erosion that is the source of sediment pollution.

The contribution of conservation districts, the SCS and 2 million cooperating landowners has been to bring soil and water conservation practices to 3/4 of a billion acres. In the process they have prevented an estimated 25 billion tons of sediment from reaching America's waterways. The contribution of districts and the SCS, along with the Agricultural Research Service and on-the-land innovation by property owners, has been to develop a tremendous technical capability for preventing or solving many land-related pollution problems.

We can suggest many practices that will keep materials in place, move them safely off the land, or treat them. All of us are working to adapt our programs and technical standards to find further answers.

Conservation practices have not stopped all the sediment, nor would they if every acre were tied down as best we know how. Some soil erosion will take place no matter what we do. It's a rather necessary evil that some sediment be produced to help streams operate properly; to slow down the rush of nutrients to the sea in order to support stream life; and to replenish our beaches with sand particles. Therefore a zero tolerance for soil erosion or sediment production is not possible, even under optimum conditions.

The new Iowa law that you will hear about this afternoon recognizes this by having conservation districts set acceptable limits for soil losses rather than branding all soil loss as criminal. As new laws are written or interpreted, as regulations and guidelines are issued, I think it is important to look for and set acceptable minimums for all forms of nonpoint source pollutants--based on specific locations, land uses, and community objectives--and to guide land use and treatment to see that these minimums are met.

The way that farmers and ranchers have achieved best results in soil-erosion control over several decades has been through the use of a conservation plan for the whole property rather than a collection of individual efforts to solve a problem. SCS has helped landowners do total conservation planning, based on:

-- The kinds of soil and other resources present.

-- The inherent capabilities and limitations of resources.

-- The conservation practices that will fit.

-- The land-use techniques or farming operations that are compatible with the resources and the landowner's interests.

-- Standards and specifications that have been developed to make sure conservation practices do their job well.

This approach to conservation needs developed many years ago is exactly what "us moderns" would now call a "systems approach" for solving problems and meeting objectives. It works. It can be adapted to any unit of land, in any use. It is flexible--when a change is made in any part of the system, the system can be adapted to take care of the new situation and still be effective.

This total conservation planning approach is being put to good test right now as America gears up to produce more food and fiber to meet urgent domestic and international needs. At the recent World Food Conference, our nation made a commitment to contribute to a badly needed food reserve. Exports for profit have increased considerably over the last few years, creating a surplus in our agricultural balance of payments that has offset a real imbalance in our other international trade. Population here at home has grown and moved and changed its preferences for agricultural goods. So the pressures for higher food production here will likely continue for some time.

The result has been millions of acres coming back into crop production or being put to the plow for the first time, and present acres being used more intensively. A concern was widely voiced at the beginning of the full-production effort that the increased farming activity be accompanied by an increased soil and water conservation activity. Otherwise any production increases achieved would not likely be sustained, conservation work of several decades might be negated in one rush for profit, and air and water pollution problems might be materially worsened.

The concern was justified where farmers did not take effective conservation measures or where new investors had not had a conservation upbringing. In many parts of the country, there were farmers who ignored the lessons of history--not to mention the data contained in soil surveys--and who planted crops where it was practically impossible to protect soil from washing or blowing. Some farmers lacked the time, money, or incentive to protect their fields with appropriate techniques of soil and water conservation. It was a year in which too many farmers gambled with their basic resources--and lost. An SCS study for the 1973 to 1974 season showed that of 8.9 million acres brought back into cultivation, 4 million acres had inadequate soil erosion control and suffered additional soil losses of 60 million tons.

But many farmers did heed the warnings. They knew from experience that higher production and conservation are not mutually exclusive goals but rather mutually supportive. There has been a new surge of interest in conservation measures such as stubble mulching, minimum tillage, terracing, and field windbreaks.

Just one example--in fiscal 1974 SCS helped install almost 2.5 million acres of various forms of conservation tillage that allow planting, weed control, and harvest with a minimum of land disturbance, for a total now on the land of more than 32 million acres. These techniques were virtually unknown a decade ago. They have saved countless tons of soil from washing downstream.

These farmers and ranchers realize that they simply cannot afford to let up on conservation, and we need to redouble efforts to assist them. We need to help them use soils information to select the right kinds of acres for crops and help them protect those acres from erosion. We want to help farmers make their acres as productive as possible, but we want to make sure that the cropping systems leave the land resilient enough to bounce back.

We want to make sure that the cropping systems continue to do their part in maintaining air and water quality, but with full consideration of America's need for food and fiber.

Good conservation aids air and water quality by keeping soil and nutrients on the land. It aids per-acre crop yields and lowers production costs by keeping nutrients within the reach of plants. It also saves energy:

-- Energy that otherwise would be needed to make the extra trips across the field with farm machinery.

-- Energy that would be needed to manufacture nutrients to replace those washed away.

-- Energy that would be needed to remove sediment and other particles downstream.

Conservation work has been applied, as I said earlier, to 3/4 of a billion acres--virtually all of it by purely voluntary effort. That is what has made soil and water conservation districts such a valuable ally of SCS and other agencies that want to improve the environment.

SCS doesn't have any acres under its control. We have helped transform the American landscape strictly through motivating people to do what is in their own best interest as well as their country's. We have to rely on others for policing, for regulations, for permits and so on.

There are landowners we haven't reached or convinced. There are changes in land use or technology or ownership that create a new challenge. There are laws and standards at all levels of government that affect land use and treatment in other than a voluntary way, and there will likely be more. Where America's environmental programs fit best along the continuum between pure voluntarism and strict regulation depends on how well we can continue to motivate individuals and how closely regulatory agencies can work with districts and other volunteer organizations at the local level. I think it's clear that the more we can accomplish because people want to, the easier it will be to enforce compliance from the rest of the people.

I think it's important, too, that standards be set as closely to the local level as possible rather than uniform standards over wide geographic areas--because of differences in soils, climate and landforms, because of types of agriculture and other land uses, because of the wide variation in kinds of stream systems and contributing watersheds.

I'm encouraged by the cooperation thus far between the Environmental Protection Agency and USDA Agencies at the federal, regional and state levels; between EPA and districts through the sediment-control institutes, and in several specific studies.

EPA is helping support a multi-agency, multi-district sediment control project in Minnesota and Wisconsin that will cost about $4 million.

In the Allen County SWCD in Indiana, Purdue University under contract with EPA is studying the impact of accelerated conservation land treatment on the quality of water in Black Creek. This is part of the international Great Lakes study. They are monitoring the sediment-reducing effects of various combinations of soil and water saving practices. My associate Norm Berg of SCS visited the area, called the Black Creek Watershed Study Project, last summer. He said as the tour progressed, the good influence of conservation work in helping clean up Black Creek became more and more apparent, more and more impressive.

SCS and EPA have joined in Task-force groups on some specific efforts:

-- Relating the 208 planning process of EPA to resource conservation and development projects and other broad efforts of USDA.

-- Discussing permit problems related to construction of large facilities and other forms of land disturbance.

-- Monitoring air and water quality as related to nonpoint source pollutants.

-- Finding approaches to dealing with nonpoint source pollution problems off the farm, such as urban development, roadside and streambank erosion, and surface-mined land.

-- Using SCS and extension service standards to meet water-quality standards of EPA and state pollution control agencies.

-- Coordinating the environmental impact statement process for federally assisted major projects.

The result of these and other similar studies will be facts to guide both voluntary programs and local and state regulation. They will aid the development of what is the theme of this conference--a reasonable and effective agricultural pollution control plan for every farm.

The role of the Soil Conservation Service will be to redouble its efforts to obtain all kinds of natural resource information and develop meaningful interpretations; to improve its monitoring capability; to put resource facts in understandable form; to get the facts to those who need them in making land-use decisions for one farm or a whole state; and to be a continuing strong advocate of soil and water conservation for the benefit of land and people.

These efforts are part of an overall USDA goal dedicated to improving patterns and policies of land use, as stated in Secretary's Memorandum 1827. Pollution problems, like many others, often are symptoms of overall problems in land use.

We recognize that major responsibility for land use planning and regulation rests with local and state governments, and with land owners and users. We want to aid them by continuing to be a source of natural resource facts second to none in the land use field through:

-- Soil surveys and interpretations

-- River basin studies

-- Watershed surveys and investigations, and flood hazard studies

-- Forest and rangeland inventories

-- Snow surveys and water supply forecasts

-- Every conceivable sort of agricultural statistic

-- Conservation needs inventory

-- Aerial photographs and maps

-- Information on rural housing and water supplies and many more

Many of these facts can be useful in pollution control programs. Their inclusion can aid in making those control programs broad enough to encompass the needs of people and the health of our environment. They can help balance objectives among all kinds of land users so that effective tradeoffs can be made.

In addition to providing these facts, we see it as our responsibility in USDA to be concerned about the impact of federal policy or programs on the ability of farmers and ranchers to meet food and fiber needs. If we don't speak up on behalf of rural America, who will in the federal government?

I believe that environmental tradeoffs can be made in a way that each of us can achieve the major part of our goals for America. Our goals are not that dissimilar. In a systems approach to the use of land and water, I believe our goals coincide.

Translating these goals into effective aid to people in improving their lives is a job in which Conferences like this one will make a real contribution. I hope all of us can take a usable idea home today and put it to work.

Thank you.

Dr. Hubbard:

Thank you, Mel. And please give my apologies to Mr. Grant for the error in the program.

Mr. Davis:

I couldn't resist.

Dr. Hubbard:

I don't quite know how that happended but I can submit a defense on the following grounds; that it was in fact an accurate statement. One would like to think that all well-intentioned, able, competent bureaucrats who are part of the solution are in fact acting, do act and do things. And I think your speech certainly demonstrates that the Administrator and Assistant Administrator of the Soil Conservation Service are in that category. Perhaps after the gall bladder operation he is back even better acting and more acting than he was before.

Mr. Davis:

I can assure you that he's an active administrator too.

Dr. Hubbard:

There seem to be no questions, which I think, indicates your remarks were thoroughly illuminating, clear and concise.

You introduced some terms we haven't heard much earlier, such as nutrients. The next speaker will talk about nutrients, and I think you set a good point from which he can pick up.

The next speaker is Dr. Samuel Aldrich, who is Assistant Director of the Illinois State Agricultural Experiment Station. He worked for the U.S. Department of Agriculture in his formative years. He taught at Cornell University for some 15 years, at the University of Illinois as Professor of Soil Fertility Extension for 13 years. He's a member of the Illinois Pollution Control Board and his subject today is Perspective on Plant Nutrients, a subject we have not talked much about. It is a controversial subject, and in my personal view a very interesting one.

Dr. Aldrich.

PERSPECTIVE ON PLANT NUTRIENTS

Samuel R. Aldrich
Assistant Director
Illinois State Agricultural Experiment Station

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Dr. Aldrich:

Mr. Chairman, I commend the organizers of this Conference for putting it together. I'm honored to be a participant with such distinguished speakers. I have read the papers with great interest. They are thoughtful and thought provoking. It is gratifying, but has also led to a feeling of humility to find ideas, which I believed to be original, expressed by others and in better language.

An informed citizenry will be willing to allocate some as yet unspecified amount of resources to the improvement of water quality.

I am concerned that we use up that commitment on the most environmentally productive programs.

In connection with the issues of food, energy and environment, increasing numbers of nonagriculturists are looking over our shoulders. They have a new-found interest in decision-making relating to agriculture. They are asking many of the right questions, but they bring to the decision-making process little knowledge of the interpretation and implementation of the data and concepts they generate.

I suggested *perspective* in the title of my remarks for a specific purpose. I have an 8-in. file on phosphorus and an 18-in. file on nitrogen and nitrates. I do not propose to make a literature review, documented with an extensive bibliography. Many reviews are already available including some that I have prepared. Neither do I plan to critique the preliminary document prepared by a five-man team in the Agricultural Research Service titled, "Contributions of Nonpoint Pollution from Agricultural Sources, Volume I - A User's Handbook." I have already done that directly to the authors. Another detailed reference is the Proceedings from a workshop on nonpoint sources in Washington, D.C., September 1974, sponsored by USEPA and the Extension Committee on Organization and Policy.

I propose to focus on issues involved in decision-making with respect to nonpoint sources, especially, though not exclusively, those where I feel there may be some misunderstanding or there is some risk that we may be heading in the wrong direction.

My *first* point in terms of perspective is to urge that we not lose sight of the fact that though we are considering *how* to control nonpoint sources, we do not yet know *what* standards are required in order to "provide for protection and propagation of fish, shellfish and wildlife and to provide for recreation in and on water."

Second, there is a fundamental difference in the strategy for point versus nonpoint pollution control. Point source inputs are controlled by setting standards for discharge and leaving the technique for meeting the standard to the discretion of the person managing the discharge. In case of nonpoint sources, it will be necessary to impose regulations or standards on the practices that are allowed. I anticipate great difficulty in developing a program with adequate flexibility for the multiplicity of ways that farmers may go about their farming operations. Furthermore, there is a not so subtle difference between telling a city or an industry the limits on its discharges to water as compared to telling a farmer how to go about farming his land.

Third, farmers do not intentionally cause or allow plant nutrients to leave their farms, thus unnecessarily enriching surface waters. Plant nutrients are production items with price tags and the price has increased dramatically in the past 2 years. This will increasingly be a deterrent to profligate application of fertilizers and animal wastes.

Fourth, when we consider strategies for controlling nonpoint sources from agricultural land, we must not overlook the fact that constraints adopted that lower yields within the midwest will export the problem to other areas, notably the feed importing areas of the northeast, mid-Atlantic, and southeast.

Fifth, principal focus is on the plant nutrients nitrogen and phosphorus. Other essential elements for plant growth simply do not present a water quality problem except possibly in some highly unusual circumstances, none of which come to my mind.

Sixth, when considering strategies for nonpoint pollution control, we must assure consideration of possible side effects from alternative strategies that might be adopted.

Seventh, I do not accept without qualification the assumption which appears repeatedly as justification for the nonpoint source program that after point source inputs have been controlled, water quality will still be inadequate because of nonpoint source inputs. No doubt it will be in some streams and lakes. But point sources add mainly natural substances for which there really is an assimilative capacity (certain pesticides are exceptions). The load from nonpoint sources coincides with a large amount of water for dilution which is an important factor in flowing waters where concentration rather than quantity is of prime importance. Nitrate concentration is, however, positively correlated with flow volume. The load from nonpoint sources also tends to be highest in the early spring when temperatur is unfavorable for excessive aquatic growth.

Eighth, the further I am removed from the point of implementation and application of programs, the more attractive they seem. Dealing in an abstract way with goals and objectives is quite different than facing the person being impacted and convincing him that you have an adequate factual basis for the proposed regulations.

Nitrogen Status

The nitrate content of major midwestern rivers has risen markedly since 1950. For example, the trend line of the Mississippi River as it leaves the midwest at the cornbelt (having already merged with the Missouri but not the Ohio River) has risen from about 1.25 mg/liter in 1958 to approximately 2.75 mg/liter in 1973. That approaches one-third the U.S. Public Health Service standard for nitrates in drinking and food processing water. Several smaller rivers (Illinois, Wabash, Kaskaskia, Embarras) have been higher in nitrate content than the Mississippi River since 1958, but have risen more slowly during the interval 1958 to 1973. Several Illinois rivers exceed the U.S. Publich Health standard during the spring months. Unfortunately, there are few states that have good data from which to plot trends in nitrate content. A minimum of 10 years, and preferably 20 years, are needed.

Much of the increase in nitrates in the major rivers derives from agriculture. Little purpose would be served in contesting that point. Instead, let's focus on what we know about sources within agriculture and what we can do about them.

We have excellent theoretical information on sources of nitrates in surface waters but little hard data from which to determine the contribution of each of the main sources: fertilizer, soil organic matter, animal wastes, and municipal wastes in some cases.

We have still less firm data from which to proceed from cause to effect. For example, we do not know what the effect would be on nitrate content of surface waters if we were to impose a limit of 50, 100, or 150 lb of fertilizer nitrogen per acre of corn.

A common mistake in planning the management of nitrogen is to consider slowly available forms--legumes, manure, sewage sludge, and slow release compounds--as substitutes for fertilizers anticipating that this will reduce the nitrate content of surface waters. Such a substitution may, in fact, be counterproductive because it increases the amount of nitrate nitrogen resident in the soil after crops are harvested in the fall. Such nitrate is positionally and temporally available for movement to tile drains or into base blow.

It is my view that the amount of NO_3^- from a watershed is governed mainly by total crop production rather than by the specific source of nitrogen. Hence, I perceive a difficult choice between food and environmental goals.

I think it possible that our plans and programs for controlling nitrates have gotten ahead of our data base as to what level is needed to protect aquatic life or human health. Convincing data are available on the toxicity of ammonia but little ammonia is found in nonpoint sources, except animal wastes. Effects of nitrates have been researched very little. They are relatively nontoxic and would likely influence aquatic life through shifts in species.

The Illinois Pollution Control Board conducted hearings in 1971 to consider possible regulations on the application of fertilizers and animal manures. The board concluded that there was inadequate information on which to promulgate any regulation. It requested the Illinois Institute for Environmental Quality to attempt to get additional information on which to reconsider the issues at a later date. The Institute contracted with the Center for the Biology of Natural Systems at Washington University to conduct a study on the nitrate problem only. Their report was published in February 1975. The report utilized available data, made a number of assumptions, and developed equations from which it proceeded to indicate constraints necessary on the combination of acres of corn and nitrogen fertilizer rates to meet a nitrate-nitrogen standard of 10 mg/liter from 50 to 99% of the time. They concluded that, with present acreages of corn, a limit on fertilizer would need to be imposed only in east central Illinois.

An advisory committee of agricultural scientists raised several important questions about the adequacy of the data base for developing the models from which the limitations on nitrogen fertilizer and/or corn acreage were predicted.

I am disappointed that the study ruled out possible effects of total row crop acreages and of the proportion of land with tile drainage. The study team arbitrarily assumed that all nitrate was from fertilizer application, stating as follows: "In the analysis of limits, nitrogen fertilizer was taken as the only source of nitrogen in surface waters; statistical problems prevented a division between inorganic and organic sources. We cannot determine the true division." (They point out that if the organic nitrogen contribution is recognized, then the limits of fertilizer nitrogen would be lower than is indicated in their tables.)

It is my personal opinion that there have been some unfortunate mistakes in dealing with the nitrate problem.

-- Much of the concern on nitrate from agriculture was generated by a paper at the 1968 meetings of the American Association for the Advancement of Science. The paper indicated that the nitrate content of the Kaskaskia River in Illinois had increased threefold from the period 1945-1950 to 1956-1968. A review of the data revealed that the sampling location was New Athens in the first period and Shelbyville in the second period; there was little change in nitrate content at New Athens from 1945-1950 to 1956-1968. The error is widely disseminated and deeply embedded in the literature on nitrates.

-- The Third Annual Report of the U.S. Council on Environmental Quality states on page 13 as follows: "The Enviro Control data show a mixed picture of trends in water quality. The problem of nutrients (phosphorus and nitrogen) is worsening dramatically in all types of basins, probably because of increased use of fertilizer." The following quotations from the Enviro Control report contradict the conclusion of the Council on Environmental Quality:

Page 16 "In basins where only agriculture is high, the limited data show no trend at all stations."

Page 17 "Where low agriculture is combined with high population or high industry, both soluble and total phosphorus got predominantly worse, but total phosphorus very much worse."

Page 18 (Re: Nitrites and nitrates.) "The nation as a whole showed dramatic worsening, with the greatest degradation coming from basins where agriculture is low and population and/or industry is high."

Page 18 (Re: NO_2^- and NO_3^-.) "As in the case of total phosphorus, in basins where only agriculture is high the limited data show no stations getting worse."

-- Four years ago the Center for the Biology of Natural Systems claimed that 55% of the nitrate in the Sangamon River traced directly to fertilizers. This conclusion was based upon a study of the change in natural abundance of the N^{15} isotope. The Center has now decided that the technique is, at best, semi-quantitative.

-- The Environmental Health Resource Service of the University of Illinois Medical School conducted a literature review on "Health Effects of Nitrates in Water." The publication has some serious deficiencies and the Pollution Control Board, for reasons that I'll not discuss, has on the record questioned the objectivity of the report.

Phosphorus Status

The phosphorus content of surface waters is of no more than moderate concern (perhaps minor) for the mid-continent surface waters, the Great Lakes being an exception. Phosphorus compounds are nontoxic at any level normally encountered in surface waters (the outfall from a phosphoric acid or similar plant may be exceptions).

The concern for phosphorus is in relation to its impact on eutrophication and excessive algal growth. These are not problems in flowing streams.

What about small lakes and reservoirs? Unfortunately, the natural background level in the agricultural midwest is 5 to 10 times the accepted minimum (0.015 mg/liter P) necessary to support algal growth.

Several characteristics of phosphorus behavior are important in evaluating its role as a nonpoint source of water pollution:

1. Phosphorus runs over and off the soil in contrast to nitrogen, which moves through the soil into either drain tiles or base flow. Incidentally, if we design practices to move less water over the surface we should expect to increase the movement of nitrate into groundwater and tile drainage.

2. Agricultural soils have a tremendous retention capacity for phosphorus which is not exceeded by fertilizer applications, even at several times the economic level. The only likelihood of exceeding the retention capacity is on small disposal areas where animal wastes or municipal wastes are applied at high rates for several years.

3. Contrary to popular opinion, fertilizer phosphorus, though water soluble, is not subject to large-scale runoff on nonfrozen fields. Purdue researchers reported about 1% runoff in soluble compounds from an application of 100 lb P on a 13% slope following 5 in. of simulated rainfall. There was, of course, additional phosphorus associated with sediment in the runoff.

4. There are three general categories of phosphorus: (a) soluble compounds, (b) plant or animal residues,and (c) sediment-associated phosphorus in nonsoluble compounds.

5. When sediment is added to water, an equilibrium is set up between the phosphorus in solution and phosphorus associated with sediment. Sediment-associated phosphorus may enrich or deplete the soluble fraction, depending upon the relative status of phosphorus in solution and that attached to sediment.

6. Research is meager, but it seems entirely logical and theoretically sound to assume that sediment-associated phosphorus contributes less on an equal weight basis to eutrophication than does phosphorus in soluble form or in readily decomposable plant residues. The only definitive study with which I am familiar suggests that phosphorus in the calcium hydroxyapatite form (a common soil compound) supported about one-seventh as much algal growth as an equivalent amount in soluble form.

Because of certain misunderstandings about the behavior of phosphorus, and of the nature of agricultural systems, there are a number of alternatives being suggested to control phosphorus from agricultural runoff which are not likely to be effective:

- -- "Reduce row crops (corn, soybeans, field beans, sugar beets, etc.) in order to reduce phosphorus in runoff." True, this will reduce the total phosphorus runoff from sloping land because it will reduce erosion. However, it is uncertain that the potential for eutrophication and excessive algal growth in susceptible waters will be reduced. Research in Minnesota reveals that the runoff of soluble organic phosphorus compounds was 3.5 times greater from the hay crop than from the corn crop in a rotation or from continuous corn.

- -- "Substitute conservation tillage systems, especially those that leave the residues on the surface, for conventional plowing and seedbed preparation." Research work in Illinois by Oschwald and Siemens showed that the concentration of phosphorus was as high or higher under conservation tillage systems than under a system involving plowing and typical secondary seedbed preparation.

- -- "Control sediment and you solve the phosphorus problem from nonpoint sources related to agriculture." I have previously alluded to the fact that soluble phosphorus likely controls eutrophication and algal growth in susceptible waters; hence, sediment control may or may not solve the problem. Sediment with a very low phosphorus content removes soluble phosphates from enriched waters.

I wish to reemphasize that before embarking on a strategy to control runoff of phosphorus from nonpoint sources, it is essential to consider the nature of the receiving waters and to decide whether they are, in fact, susceptible to eutrophication and excessive algal growth. If not, it is inexcusable to impose constraints on agricultural practices for the purpose of reducing phosphorus runoff.

Summary

When a raindrop strikes the land it has already taken on nitrogen and phosphorus from the atmosphere. As it moves over the surface or percolates through the soil, it picks up additional amounts. These nutrients sustain desirable aquatic life. They cause problems only when they result in excessive aquatic growth, or selectively favor less desirable species, or endanger human health.

A considerable amount of new information will be needed before we know the levels at which nitrogen and phosphorus contents are unacceptable. Because of differences in soil regions, types of agriculture and in the characteristics of receiving waters, uniform programs over wide geographic areas seem ill-suited to nonpoint pollution control.

I applaud the suggestion in some recent position statements that educational programs delivered through existing institutions (Cooperative Extension Service, Soil Conservation Service) should make up a major thrust in the control of nonpoint sources of water pollution.

Plant nutrient inputs can be controlled at a price. Until we know the acceptable levels of nitrogen and phosphorus in surface waters and the cost to achieve them, we do not know whether the price is an economic and environmental bargain.

Dr. Hubbard:

Thank you.

Any questions?

Mr. Oren Long (Environmental Protection Agency, Region VII):

I ask you this question because of some of the practical things that you said in your speech here. Maybe you read the latest issue of the Farm Journal magazine. Harold Minor was in there, top corn farmer from Iroquois County, Illinois, and he was quoted as saying if people want food as badly in the future as they say they do, they had better give farmers some encouragement right now, or we won't be here 5 years from now. Some won't even be here next year.

Cattlemen are even in worse shape. I know that if I fertilize my pastures according to university recommendations, my fertilizer bill will run about $30 an acre. At today's cattle prices I can't afford this kind of expense, but if I don't, my pastures will begin to deteriorate and erosion will increase.

Is legislation an effective tool with which to control on-farm land management practices and problems you have just mentioned in the face of these kinds of economic pressures, which I might add are in addition to the natural uncertainties that are already inherent in farming?

Dr. Aldrich:

We just ran out of time.

I really don't think that I can constructively address myself to it. It's a good question, but it's the kind of question that you address to the whole audience, not just me.

Dr. Hubbard:

Well, we will adjourn for lunch. We will come back here about 1:30.

(LUNCHEON)

(FILM)

Dr. Hubbard:

This beautiful film you just saw about the Flint Hills of Kansas was a publicity film for the Tall Grass Prairie Park, and it is necessary that I enter a disclaimer at this point (not a personal disclaimer, I'm for the Park). Midwest Research Institute and the Environmental Protection Agency takes no position on the Tall Grass Prairie Park. I think it's an appropriate movie, though, because as Tom Murphy mentioned this morning one of the things we need to look at is the natural background, the base-line against which one judges nonpoint source pollution. Surely, when the prairie did belong to the buffalo and the Indian, there was nonpoint source pollution even then.

Another reason for showing it is that it's a graceful way to get people in after lunch and get the Conference started again.

With that, I would like to turn the podium over to our friend Jerry Svore, of the EPA who will be your chairman for this afternoon.

AFTERNOON SESSION

INTRODUCTION OF SPEAKERS

Jerome H. Svore
Regional Administrator
Region VII - Environmental Protection Agency

Mr. Weaver:

Thank you. I will say it will be a pleasure for me to serve as Chairman this afternoon and especially to introduce our first speaker.

I have known Dwight Metzler for many, many years, and in going over his biographical sketch, I found he obviously can't hold a job. He did start out in Kansas and he finally came back, and it has always been a pleasure for me over the years to associate with Dwight. We have held similar jobs a couple of times in our careers and used to work together when we were both back in the Missouri River Basin before.

Dwight is a Kansan. He went to school in Kansas. He took his graduate work at Harvard in Sanitary Engineering. He came back and was Chief Engineer with the State Board of Health as it was known in those days, and later moved over to the Water Resource Department.

Shortly thereafter Governor Rockefeller decided he needed someone to run the water pollution program in the State of New York. Apparently Governor Rockefeller at that time had floated a bond issue for about $1 billion and he needed a farm boy to run it, so he asked Dwight to come on in and help him, which he did for the next 6 years.

He got things straightened around back there in New York and came out to be the first head of the Department of Health and Environment. He is the only engineer in the United States who holds that job.

It's going to be a real pleasure for us to hear from you at this time, Dwight.

STATES ROLE IN FORMULATING CONTROL STRATEGY

Dwight F. Metzler
Secretary of Health and Environment
Kansas State Department of Health and Environment

Mr. Metzler:

Thank you, Jerry, for that nice introduction. It's always a pleasure to work with you, and certainly one of the attractions of coming back to Kansas was knowing that we had somebody managing the EPA regional office out here who knew something about midwestern problems and had some understanding of what it took to solve them.

I want to congratulate Midwest Research Institute and EPA for having this Conference. It's certainly a very timely one. I hope that what I will say this afternoon will contribute to the overall objective of the Conference; that is, promoting dialogue, and toward the end of developing some reasonably effective plans to control agricultural pollution.

Jerry has already indicated that I am a farmer at heart. I really might come before you and say that's my avocation, and my job as an environmentalist permits me to afford a farm. My convictions are those of an environmentalist, my job is that, and I don't pretend to understand all of the problems that agriculturists have, although I learned at a rather early age how to pitch bundles into a 48-in. threshing separator and some of those things.

In the interest of promoting dialogue and developing reasonable and effective plans, first we can take a rational approach. Jerry mentioned Harvard, and certainly Gordon Fair, who was there, was the country's outstanding exponent of the rational approach. Jerry and I have benefited from sitting through at least two semesters of listening daily to:

"Gentlemen, whenever you approach a problem, be sure that approach is rational."

Being a candidate for the presidency or the vice-presidency of the United States is not as high in our priorities as it was in the drafters of the law that became Public Law 92-500, and so hopefully we can adopt a rational approach.

First, what is the problem? In this area, in spite of all the verbiage, it seems to me the problem is relatively simple to define. It's a matter of too much sediment and too much nitrogen. There may be some place in Kansas where phosphorus is a problem. If so, I'm not aware of it. I certainly wouldn't make that kind of a statement if I was in the State of New York, for there much lower levels of phosphorus become important. You take Lake George, which some have compared with Lake Tahoe. You can see a silver dollar in 20 ft of water in Lake George without any trouble. It's a very young lake, and with that kind of sunlight penetration phosphorus becomes a very important element and perhaps the limiting nutrient if one is to prevent undesirable algal or weed growths.

As far as I know, the problem in Kansas and in general in this four-state area is not a serious one so far as phosphorus is concerned.

Now, pesticides may be a problem and certainly we need a strategy for controlling in every way possible the runoff of pesticides. There's still a great deal that we don't know about the buildup of toxic chemicals in the environment, and certainly the mercury scare gave us a little understanding of how through the food chain coming up to the fish it's possible to take water with microscopic amounts, very low concentrations of mercury, and concentrate them in fish flesh as much as 3,000 times. So there's a great deal that we do not know about the concentration of toxic chemicals in the environment, and as this may be contributed through pesticides, then we need to be cautious.

I suppose what we really need, it seems to me, in developing a strategy which is rational, is to ask does it affect human health, is it needed because it affects human health, is it needed because it improves the quality of fish or wildlife, or is it needed in order to control algal growths or the growths of weeds. If it doesn't meet that test, then I would say we don't need it. If there are waters where agricultural runoff doesn't contribute to any of these problems, then I would submit to you that we could put that on the back burner and not worry about that very much because there are plenty of areas where it will.

It seems to me that a rational approach is needed, and in a way we should look at what has worked. We don't happen to be the first people who discovered this problem. One of the things that impressed me, incidentally, the times I've been in the Soviet Union is that the Russians aren't proud when it comes to seeing what somebody else has done that works. They took our John Deere tractors and they duplicated them. They sound just like a John Deere, they are green just like a John Deere, and they call them by a Russian name. They invented it, but they are using an American tractor that would be called John Deere in this country. The same thing is true of the other principal tractor they have there which they call something else but sounds exactly like an International Harvester and is painted red like the IHC tractors are.

It seems to me that too often we think we have to rediscover the wheel, perhaps, and re-invent things that will work. The Ohio Conservancy District, for example, has done a good deal in this area. The Pennsylvania Dutch down in Lancaster County, Pennsylvania, have had a lot of success at this for a long, long time. I don't know, a 100 years, maybe. The British have done quite a job with their river basin authorities.

And so there are some approaches and there are some things, it seems to me, to be learned when we start talking about controlling nonpoint and particularly agricultural source pollution.

Second, we need to be sure we understand the problem, and that's why I'm back pounding at the principal concern being that of sediments and nitrogen plus any toxic materials that are introduced. If there is anything that we are good at, it seems to me that Americans are pretty good at planning, and certainly planning how to do this, designing a strategy on a basin-by-basin basis, makes a great deal of sense. We know a lot about improved practices and controls, and we need to get those in place. This takes continued education of the American farmer and it won't happen suddenly, although we can continue to make improvement there.

We also need to monitor to see what's happened and what improvement has occurred. I am very grateful to Jerry for not telling how long I have been around in this business because I really wouldn't want to admit to it. Nevertheless, I have been around long enough to hear people say, well, primary sewage treatment, if we could get municipal sewer systems to discharge into primary treatment, except along our limited streams, things would be in pretty good shape.

And then we set secondary treatment as an objective. And certainly the trend of the Congress and of some of the Federal Administrators has been, and this applies to a lot of other areas, education, social welfare, health, not just environment, that each time you move the performance level up another notch we set a standard that's still higher, which makes it appear that we are falling behind faster and faster. That's not a technique which we perfected. Actually, the Egyptians used it and the Romans used it and a lot of other people have used it. Nevertheless, you need to be aware that that kind of thing is going on, and we do need to monitor what's occurring to see whether improvement is really being made on a rational basis.

We need to avoid the temptation to set uniform standards. Reference was made at least once, perhaps more often, this morning to the Tunney amendment of the Public Law 92-500. Senator Tunney insisted on his amendment to the draft which Leon Billings wrote originally. He got it in committee and he didn't care about any of the other amendments, but he sat through the long deliberations on that bill to be sure that the Tunney amendment got in, which said that we are going to put the waters of the country in a good enough shape--and he had the word "optimum" in there and that word got struck, except that he had it optimum use, benefit of fish and shellfish and wildlife, and the phrase which followed. His idea was that there were industrial and municipal polluters. Particularly the industrial ones would jump from one place to another, and if we didn't set a uniform national standard we would never get pollution abated.

Actually, I hope we recognize that every river basin is different and that it requires a different control strategy to be effective.

Now a word about time frame. I have said we need to set some reasonable goals. We ought to set some reasonable goals for accomplishment both as to the end result and how long it takes to get there. We need to recognize that time is required and there are a lot of disillusioned mayors and city councils around this country because of the time limits that were set and promises made in the passage of 92-500 that have not been kept. It would be too bad if we undertook a crash program with the agricultural community and then it took them 5 years to discover that no one really takes these seriously anyway except as a matter of statement of principle.

We can't expect instant results, but we need to get moving, we need to accelerate changes occuring. There are better farming practices; we are doing things, but we need to accelerate that rate of change.

One more point that I would like to make, and I will tell you a little bit about Kansas and quit. Change in this area costs money and it costs lots of money, in spite of what other persons may have said here today or previously. Again, I watched the estimates. As a matter of fact, one of my most embarrassing moments was when a governor turned to me with respect to a program and he said, "Dwight, what's it going to cost?" And I gave him a figure. It was the best figure I had, and I thought it was so big that he would flinch. He didn't flinch, but my embarrassment was caused by the discovery a year or two later that I was only showing him the tip of the iceberg and that the cost was probably 5 to 10 times as great as I told him it would be.

This kind of change requires money, and it is either going to have to come from the private sector, or it's going to have to come from the governmental side or some combination.

Let's say this is going to come out of the consumer's pocket and maybe it will only be a half a cent extra per pound of beef per year. I don't know about that, but I sure have noticed what happened as far as the air pollution controls on automobiles that were mandated by the 1970 Clean Air Act. Whether the principal cost of increased operation for cars is really environmental or whether the cause was inquiries or various other factors I don't know, but I do know that the public outcry was so great that they turned Congress around and they have unhooked some of the requirements of the 1970 Clean Air Act as far as automobiles is concerned. And the reason for this was that a rational scientific approach was not taken. It was simply this blind faith. And there was a lot of fault in Detroit, too, because the big auto makers said, "You tell us what standards you want to meet and we will meet them."

And so this is not all the fault of the legislators. But nevertheless, they mandated an approach that turned out to be so expensive that people are not standing for it, and people in the cities, anyway, are going to suffer with poorer quality air than would have been necessary had a rational approach with a scientific base been taken.

Well, I was talking about financing. If the private sector finances it, I think we will be seeing some signs of distress. We will see the general escalation of costs blamed on environmental improvement. As an environmentalist I don't like that, because that reduces the support for true environmental improvement.

And let me say that if we are talking about Congress that my impression is that Congress isn't going to put up any money to make this change occur. Now, Congress has put up a lot of money to try to aid water pollution abatement for municipalities, but they are looking for ways to get out of that. And you look at how much they put up for soil conservation districts for watershed improvement.

As a matter of fact, I will go back 10 years. In 1965, fiscal year 1965, Kansas received as much in capital construction from Bureau of Reclamation and Corps of Engineers projects as the entire 50-state funding was for capital projects in the soil conservation program. That was about $65 million. There has never been any real desire on the part of Congress to provide substantial amounts, and I don't see any now, and as a result I think we have to decide that the private enterprise part of the system is going to have to pay for this.

Now a little word about Kansas, actually. I apologize for imposing those somewhat biased views upon you, but it seems to me that that's the general direction that we must go if we are to really make improvement and be able to demonstrate it.

We have done some work in Kansas over a long period of time starting back with some water sampling and chem-analysis work. We started about 80 years ago, in the 1890's, and a little bit of that base data is certainly valuable now when we are trying to determine how much impact man has had upon the quality of waters. The work that we are doing so far as nonpoint source measurement is concerned has been limited to identifying the impact of various water pollutants upon the surface waters, both the rivers and the lakes. As such, this gives us some measure of background pollution normally present with surface waters today and gives an indication of the overall scope of the problem associated with nonpoint pollution.

The Department of Health and Environment maintains a statewide surface water surveillance monitoring system which has over 300 measuring stations. The present ongoing program measures the traditional parameters, chemical, bacteriological, physical, biological, and has not been especially addressed to stream sediment loads other than as suspended in dissolved solids. This program has been in operation for many years. We have been fortunate that Kansas has always prized its water, and it's been an activity that the state legislature has been willing to fund for many years.

It includes, of these 300 stations that I mentioned, 130 for chemical and bacteriological analysis; 36 of these give a stream monitoring station for biological analysis, which, of course, is considerably more difficult to automate and accomplish, 90 reservoir stream stations for both chemical and biological analysis; and 110 for recreational water monitoring, primarily bacteriological analysis. In addition, more intensive water quality information is collected within each of the state's 16 river basins and this is done on an intensive basis about once each 3 years and encompasses the full range.

The majority of the time all the major streams within Kansas are in compliance with the standards which Kansas has adopted and which are a part of our standards filed with EPA, so that they also are national standards. The total dissolved solids concentration and the fecal coliform content have the most frequent violations, represent the areas of most frequent violation. Total dissolved solids violations occur as a result of highly mineralized stream flows entering streams from geological formations. We have Saline River, for example, cutting across salt deposits, and other areas of the state. Also, we have the same phenomena. Most easily recognized is the chloride phenomenon from the Saline River and then down in the Arkansas. Fecal coliform violations occur usually as a result of rainfall and excessive runoff or snowmelt and the accompanying runoff. This observation is substantiated by a substantial amount of data which are collected as a part of our regular monitoring program. It's also clear, from the results of a special intensive water quality study program which we did on Soldier Creek north of Topeka, that agricultural land makes major contributions for this area. There really is an absence of human waste sources.

The fecal coliform standard was violated approximately 25% of the time there directly as a result of nonpoint source runoff.

The fecal coliform effluent limitation for treated domestic wastewater discharges are 200 fecal coliform per 100 ml, and this is an extremely stringent limit; few wastewater discharges in Kansas now meet it. However, at low stream flow the fecal coliform standards of 400/100 ml in Class A waters and 2,000/100 ml in Class B waters are rarely violated. These streams standards are violated, again, during periods of excessive stream flow either from rainfall or snowmelt. Additionally, it's during these periods that nitrogen, phosphate, and perhaps the pesticide loads are the highest. Certainly there's a question about the latter.

Runoff from agricultural land is the single greatest water quality problem in terms of pounds of pollutant, aside from sediments, of course, that are involved. The control and solution of this problem must be implemented right out at its source. It means local controls have to be put in effect. We have documented that the vast amount of water pollutants from nonpoint sources is attached, then, to sediments.

Under the provisions of 92-500, Section 303e requires the completion of water quality plans for each of the 16 major river basins in Kansas. Our department will have the first of these plans completed by July 1, and nonpoint source pollution considerations, of course, are included as a part of the plan. These will not be contained, however, in the first report.

Section 304 of the Act calls for EPA to provide information and guidelines. We have heard some about that this morning and are looking forward to having more of this information to guide our activities in Kansas.

Now, in Kansas, no matter how you organize government--and Kansas at the moment is trying to make government more responsive by organizing a relatively small number, by moving from 200 boards, commissions and agencies down to a manageable number of agencies such as my own with a cabinet level secretary. This still means that there's a lot of crossover and you have to do a lot of work, and we are working closely with the Kansas Water Resources Board, which is the water planning and development agency for the state, we are working closely with the Soil Conservation Commission, Charlie Bredahl is here today, the State Board of Agriculture, and, of course, planning hasn't stopped at all as far as the federal water resource agencies are concerned, and we will be working with them also.

Kansas has had the good fortune of being predominantly an agricultural state, and we had a lot of receptivity among our farmers about soil and water conservation practices. The State Soil Conservation Commission and the USDA Soil Conservation Service have worked jointly over many years to reduce soil erosion and sedimentation. The first conservation districts in Kansas, as a matter of fact, were organized in 1938. One hundred five conservation districts have been established in the state, and each district coincides with the county boundaries and has offices with support personnel. Substantial results have been realized from these programs in reducing soil erosion and sedimentation. Over 18 million acres of Kansas land have received what is judged to be adequate treatment to minimize erosion. That still leaves us nearly 30 million acres, which require some additional degree of treatment. There are 80 organized watershed districts in Kansas, and these organized watershed districts cover some 11 million acres. A total of 450 structures have been completed or are under construction, and there are an additional 300 planned and waiting federal funds. Additionally, approximately 800 structures have been completed for floodwater detention and retardation.

The development and implementation of a successful management plan mandates close cooperation, as I have already indicated, between the agencies involved. As far as the department is concerned, we are expanding our program activities for identifying problems from nonpoint sources.

It's important that soil erosion and sedimentation legislation, regardless of form, reflect conservation and environmental considerations, and the Kansas legislature is looking at that problem now. It studied it, thinking maybe it would follow the lead of some of the other states, such as Iowa and Pennsylvania, with an act this time, but, you know, some of these decisions are hard ones to make, and we keep thinking we will learn some more from the experience of others, and so we will continue to study that, hopefully leading to definitive legislation next year.

One last thought that I would like to leave with you. I figured up as I was sitting down here waiting to take the podium that I have worked for 10 governors now, and more than half of those have said at one time or another, "You spent an awful lot of money at this. What do you have to show for it?" Now, I don't happen to be one of those sanitary engineers that say that, well, our municipal-industrial waste treatment program was a failure. As a matter of fact, it wasn't. We spent a lot of money in that area nationally, and we have cleaned up a lot of water in spite of the General Accounting Office and others who have thought we went at it the wrong way. The fact is that there are fish and there are game fish in a lot of streams today where there were not 10 years ago. They are harvesting shellfish in areas off of Long Island, for example, where they haven't harvested them for 40 years, as a result of this kind of program. And you can take that from New York and Kansas and extrapolate that to most, if not all, of the other states.

Nevertheless, we simply haven't had very good tools for saying, here's how much improvement has occurred, because these river systems are very complex, and a potentially useful, but thus far sparsely recognized, management tool has been developed to help us do that. It's called the Water Quality Index, and it utilizes a single empirical number to rate the relative quality of water over a given period of time and let you know whether things are getting better or worse. Each time I read those reports of the CEQ, the Council on Environmental Quality, I keep looking for some recognition that all this money that we spent really is doing any good. Well, here's a tool that I think may let us. The value is condensed for water quality data; it uses nine critical parameters. It was developed in Kansas. As a matter of fact, if it hadn't been for Jerry Svore it wouldn't have happened. He provided the support for an idea which Nina McClelland of the National Sanitation Foundation had, and they demonstrated that it really works on the Kansas River.

The next question was, does it work any place else? And with a little arm twisting of my staff in Albany I said, you know, if this works in Kansas it ought to work in New York. We had some first-rate people there who understand water quality management; and after they had reviewed the process, they were intrigued enough by it they tried it out. Now they think it's the greatest thing that's been discovered since green apples.

And so I want to say to those state people who are here and who will be influencing policy back in your home states: insist on getting into place some sort of a tool which gives you a feeling for what's occurring, whether things are getting better or whether they are getting worse. And you know, I really don't want to be around 5 or 10 years from now if we continue to spend at the rate of some billions of dollars every year, and people suddenly discover that we have hoodwinked them and that the water is just as bad or maybe a little worse than it was before. I don't think that's going to happen, but nevertheless if we don't get some sort of measurement system which we can agree on across the country, we will be accused of that.

Well, in quick summary, the solution to this problem we are talking about requires careful planning and a rational approach, it requires major financial commitment on the part of the agricultural industry, and I think government. There is no doubt that the program will benefit. It is not competitive with the conservation of soil and water, and those that are interested in good use of the land and good use of the water can't help but support environmental controls. We ought to press hard for implementation.

Thank you very much.

Mr. Svore:

Dwight, I think we may have some questions. Sitting there listening to you talk, I couldn't help but think that you were enjoying yourself more than you would have been if you were talking about medical services or nursing services or veneral disease control programs, some of the mundane things that you are responsible for. It's nice to have you back in engineering for a few hours.

Are there any questions for Dwight in regard to the state program and state activities in this area?

They are going to let you off without any questions, Dwight.

Mr. Metzler:

It cost. I bribed each of them as they came in.

Mr. Svore:

Well, we may get at you later on during the panel discussion, so don't go away.

Thank you very much, Dwight. As always, I enjoyed your very fine remarks.

Your program says that the next speaker is the Honorable Dale Cochran, the Speaker of the House of Representatives of the Iowa General Assembly. Speaker Cochran is not here today, but he has sent a pro in order to present his paper and, of course, to answer any questions afterwards.

Dan Lindquist is also a Professional Engineer. He has a degree in Agriculture from Nebraska. He then went back and got a degree in Agricultural Engineering. He is a registered Professional Engineer.

He is with the Soil Conservation Service now in the State of Iowa, where he has been for 14 years, Iowa and Ohio, and at the present time he is developing the water management plan in six of the conservancy districts specified in the Iowa law.

So it's with a great deal of pleasure that I introduce Dan Lindquist, who will speak to us now on the positive appraoch to soil conservation.

Mr. Lindquist:

Thank you, Jerry.

Formerly with the Soil Conservation Service, now with the Iowa Department of Soil Conservation.

Mr. Svore:

All right.

A POSITIVE APPROACH TO SOIL CONSERVATION

Dale M. Cochran
Speaker of the House
Iowa Legislature

Read by

Dan Lindquist
Iowa Department of Soil Conservation
Des Moines, Iowa

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Mr. Lindquist:

Soil erosion is the number one water pollution problem in Iowa and many other states. It is a great loss in every state, but in some areas it is overshadowed by the problems associated with a great concentration of industry or heavy population.

Annual soil conservation efforts in the United States total billions of dollars. The various states have a work force of state employees assisted by a horde of federal technicians coping with soil erosion problems. Within each soil conservation district the commissioners or supervisors are also working faithfully and diligently to control soil erosion.

I will be the first to say "hats off" to these people who have done an outstanding job over the past 35 to 40 years.

Yet with all these efforts:

We will witness much erosion by wind and water.

We still see deep gullies being cut into farmland, rendering it worthless.

We still see dust flying through the air, filling ditches and fence rows.

We still see millions of tons of good topsoil going down the river.

We still see wonderful natural and man-made lakes filling with silt, greatly reducing the value for recreational and other purposes.

We still see levees being built higher and higher to compensate for the rise in the river bed due to soil erosion.

We still find bodies of water polluted with fertilizer, pesticides, herbicides and other chemicals.

The net result--a terrible waste of good productive topsoil, an inexcusable waste of taxpayer's money to dredge our lakes, to build our levees higher, an environment detrimental to our health and well-being, and a disgraceful disregard for future generations.

If I have any criticism, it is certainly not with the people who are carrying on the soil conservation battle, because they have done an excellent job, but rather with the tools and system with which these people have had to work. In Iowa, much of this changed and the horizon looked much brighter starting on July 1, 1971. That is the date our new Conservancy District Law became effective.

A good many states have laws establishing sanitary landfills and replacing the old rat-infested dumps.

Because of recent legislative action most states have a commission with strong laws to control air pollution, a commission to control about every source of water pollution, including feedlot runoff, but without strong laws to control pollution from soil erosion.

Yet knowledgeable people tell us the number one pollutant comes from the erosion of the soil--from the millions upon millions of acres of cultivated land and from road and street projects, housing development areas and other areas where the barren soil is exposed. Soil erosion causes 700 times more water pollution in the U.S. than all other froms of pollution combined.

Under past circumstances and laws, authorities in Iowa were handcuffed to do anything significant in further reducing soil erosion and the resulting pollution of our streams and rivers and lakes. Only 35% of the land in our state had adequate conservation practices being applied. We had hit a plateau. This figure had become rather static because erosion control had been strictly a voluntary effort.

Other disturbing factors in soil erosion control are the rapid shifts in land uses from agricultural and rural to nonagricultural and urban uses and by changes in farm operations and ownership. These changes are accelerating the process of soil erosion.

First, I would like to relate how the Iowa law was developed and then briefly cover the development of some model legislation.

The Iowa Conservancy District Law of 1971 gives soil conservation people authority to mandatorily apply soil conservation practices.

This is an act relating to the conservation of soil and water resources of the state and to the control of water pollution. It is concerned with erosion by both wind and water.

Keep in mind that the Iowa Department of Soil Conservation is the state coordinating agency. The department's governing body, which is the State Soil Conservation Committee, also acts as the governing body of each of the six conservancy districts or watershed districts that are established in this bill covering the entire state. The six state soil conservation committee members, one from each conservancy district, plus an at-large member who represents cities and towns, and one representing mines and minerals constitute the voting membership of the committee. There are four ex officio, nonvoting members on the committee, including the Secretary of Agriculture, Dean of Extension at Iowa State University, Director of the Iowa Natural Resources Council, Director of the Iowa Conservation Commission, and also the Director of our newly created Department of Environmental Quality.

The five soil conservation district commissioners in each of the 100 local soil conservation districts in Iowa are responsible for carrying out soil conservation compliance. One of the basic strengths of the Iowa Conservancy District Law is the fact that much of the control and authority is vested in soil conservation districts and their elected governing bodies at the local level.

When we first drafted our proposal the soil conservation people on both the state and local level said they couldn't handle it and didn't want anything to do with it. I told them they were the experts in the field, we had to have such a law and was going to pass it. If they didn't want it we would give the authority to someone else.

After some thought our soil conservation people came out swinging for the bill and made its passage possible. Remember our bill was 6 years in the making. Three years in the study committee. The 4th year it was introduced in the legislature but got nowhere. The 5th year it passed the House. The 6th year it passed both Houses.

The soil conservation district commissioners formulated soil conservation regulations for their district as were deemed necessary to establish soil loss limits for the district and provided for their implementation. This was done with the approval of the State Soil Conservation Committee. The first public hearings in the districts were held on May 1, 1972, and all 100 were completed by January 25, 1973, a period of less than 7 months. There were no official written objections in any of the 100 hearings. The passage of the bill was made possible and resistance negated because our district soils commissioners got behind the idea and sold it to the public. Without them we would have failed.

Soil erosion resulting in or contributing to damage to property not owned by the owner or occupant of land on which such erosion is occurring is declared a nuisance.

Any person or agency believing a nuisance is being created because proper practices are not being applied to adjoining soil to prevent damage erosion may file a complaint with the commissioners of the soil conservation district in which the alleged damage is occurring.

Let me give you some examples:

1. An individual owner or occupant of land could file a complaint if he felt eroding soil from a neighbor's land was damaging land, fence, crops or other property.

2. A county board of supervisors could file a complaint if wind-blown soil was filling a road ditch and causing damage.

3. The State Conservation Commission could file a complaint if soil erosion and resulting pollution was moving into a lake under its jurisdiction.

4. A city could file a complaint against those in charge of a construction project, such as a housing development area or a road or street construction project.

If the soil conservation district commissioners find the complaint is justified and that erosion is causing damage, they declare it a nuisance. They then inform those responsible to control any erosion by whatever means they felt would best fit their operation.

In the case of erosion occurring on the site of any construction project, road project, housing or shopping center development area or similar undertaking involving the removal of all or a major portion of the vegetation or other natural or man-made cover, exposing bare soil directly to water or wind, the commissioners shall state a time not more than 5 days when work necessary to establish or maintain erosion control practices must be commenced, and a time not more than 30 days when the work is to be satisfactorily completed. As much as 1,000 tons of eroded soil can come from these areas per acre per year.

In the case of agricultural operations, no owner or occupant of land shall be required to establish any permanent soil and water conservation practices unless public cost-sharing funds in an amount equal to at least 75% of the cost of establishing such practices have been specifically approved for such land and actually made available. Cost-sharing levels for temporary conservation practices shall be set by the State Soil Conservation Committee.

The Iowa Commissioners will state a time of not more than 6 months to begin the necessary soil and water conservation practices, and a time not more than 1 year when the work is to be satisfactorily completed.

If an owner or occupant of land fails to take the necessary steps to control erosion after being notified, the commissioners shall petition the district court for a court order requiring immediate compliance.

We have a plan to help control Iowa's number one pollution problem. The operators of farms are not able to pass the costs of operation on to the consumer. Also, conservation is a benefit to society. Thus the reason for requiring public-cost-sharing in the establishment of agricultural conservation practices is in this piece of legislation. But unless funds are made available, little can really be done to cope with our soil erosion problems.

Iowa has recognized not only the need for soil conservation practices that have teeth in them, but also ample cost-sharing to assist land-owners in carrying out the work.

The Iowa legislature appropriated in 1973--$1.5 million for fiscal year 1973, and also fiscal year 1974, for cost sharing purposes. Last year the legislature added another $500,000 to the 1974 fiscal year appropriation for a total of $2 million. These appropriations were a first in the history of our state and possibly in the nation. This year we are suggesting that $2.5 million be appropriated from state funds for each of the next 2 years for controlling the erosion of our number one natural resource--soil.

These appropriations from state sources were originally suggested at a time when Iowa was slated to receive $8.5 million in federal cost-sharing funds. But the administration impounded $225 million of cost-sharing funds in December 1972. These funds were finally released through a court order.

This year the President is again recommending that no funds be made available for cost-sharing to control soil erosion.

Actually we need further financial assistance from the federal government, not less or nothing. I think it is very disappointing that the federal government speaks with such a loud voice about controlling pollution and then fails to put its money where its mouth is.

For over 30 years, the Department of Agriculture allocated cost-sharing funds to the various states through a program called ACP (Agricultural Conservation Program). The emphasis was on soil conservation. In recent years the funds have been reduced consistently.

In line with a great publicity campaign, the federal government in 1971, changed the emphasis to pollution control and the cost-sharing funds were disbursed under a program known as REAP (Rural Environmental Assistance Program).

Sounded great! Washington was going all out for pollution control. The only hooker in the program was the fact that the funds were reduced further in both 1971 and 1972.

But that was nothing. The administration then took the unprecendented slap at the farmers and rural America by cutting out all cost-sharing funds.

The President backed up the short-sighted decision of cutting out all REAP funds by stating, "The farmers are making a good income now, so they can afford to pay for all of their conservation practices."

I have news for the President and Congress. We have had some exceptional years. You wouldn't expect our level of net income of the last couple of years to last. History has proven that. On top of that, preserving our greatest natural resource, soil, is a society problem, not just one that falls on the farmer's shoulders, no matter what our level of income is. This is a philosophy that has been around for nearly 40 years, at the time the Soil Conservation Service came into being along with cost-sharing programs.

The bureaucrats in Washington have been telling farmers, businessmen and industry to control pollution, and have devised all kinds of penalties if certain rigid standards are not met.

While they pretend to be the champions of the environment, they pull the rug out from under the farmers. Soil erosion is Iowa's greatest pollutant, and very possibly ours too. It doesn't just affect farmers, but it also affects the people who use our lakes and streams. Eventually these bodies of water have to be dredged at a tremendous cost to all taxpayers, rural and urban.

This program has not just been one of conservation, but equally one of protecting our environment for city, as well as rural people.

I have discussed Iowa's plan for controlling soil erosion. Now let me point out that a model act on soil erosion and sediment control has been drafted by a task force committee working on behalf of the Council of State Governments. This legislation was developed and then approved at the National Legislative Conference in August 1972.

People on the drafting committee represented legislators, USDA, SCS, EPA, and the National Association of Soil Conservation Districts.

The act was developed by the use of considerable background material such as legislation being enacted in several states, expert testimony and various pieces of material prepared to deal with the subject.

I will only mention where the model law differs significantly from Iowa's law:

1. A person dealing in agricultural operations must have an approved soil conservation plan and further must be following the plan. Iowa's law is weak in this respect because it only states that after damage is caused and a complaint is filed can action be taken. But as I stated earlier, sometimes it takes a compromise effort to get anything passed in a legislative body.

2. A conservation plan must be approved before a building permit is issued in nonagricultural activities in the model law. Iowa's law, again, states that after damage is caused and a complaint is filed, an action can be taken.

3. Compliance with approved conservation practices is not manditory nor any penalties involved in the model act unless there is available at least 50% cost-sharing assistance with respect to agricultural and forest lands. Iowa's level is 75%. This is too high in most instances but it was a compromise to get the bill passed. Those who wanted to kill the bill forced this in.

4. An advisory board shall be appointed from such interests as housing, financing, industry, agriculture, recreation and local governments to assist the state agency and also the district soil commissioners in the development of conservation regulations. Iowa's law does not provide for this intergovernmental cooperation. This is an excellent feature and should be included.

Everything points to a crying need for controlling siltation. Silt is like gold when it stays where the Lord put it. It is pollution when it hits a city water system, or is carried into a lake. Clean, clear water, always a blessing, could become a rarity as it already has in some areas of our great nation.

The 1970's will either be known as the decade when man finally gained control of his environment or the decade that was the beginning of the end. Which side do you want to be on?

Let's give Earth a chance and in turn assure mankind of a future.

Mr. Svore:

Thank you, Dan. You have the privilege of diplomatic immunity or something now in answering any questions. If you don't like them, you can say it isn't your paper.

Are there any questions or comments?

Yes.

Mr. William J. Sallee (Environmental Quality and Land Use Division, ASCS, Washington, D.C.):

Beginning very early this morning we had references to the conservation cost-sharing program, then we had references to it by Dr. Schnittker, our luncheon speaker, and again in this paper I though this was a good time to clarify a few points.

The first point to clarify is this: there will be a program operating in 1975, announced on March 17 at the $190 million level of cost sharing for the conservation program. The name has been changed back to Agricultural Conservation Program, ACP.

On the same date there was announced a $25 million Forestry Incentives Program, commonly called FIP.

As Dr. Schnittker indicated at lunch today, for the past 15 to 20 years the ACP program has had budgetary problems. It's hard to explain. No one, I guess, really knows why. This program started in the 1930's administered by Agricultural Stabilization Conservation Service, ASCS, and predecessor agencies, assisted by the Soil Conservation Service, the Extension Service, the Forestry Service, and other agencies in carrying it out. It may be that one of the problems of the budgetary activity is that from the very beginning, in the 30's, the theory was that we will have this program to demonstrate to farmers the good possibilities with conservation measures, so maybe some of the budget people think that it has been demonstrated. I'm not sure.

But anyway, for 15 years we have had problems with the budget, knowing whether or not the program was to be funded, at what level, when we could carry it out, etc. Some of us thought that in the passage of the Agricultural Act of 1973, in which Title X provided for a conservation and pollution abatement cost-sharing program, re-emphasizing that the Soil Conservation and Domestic Allotment Act was to be carried out, the matter was straightened out. In getting that in the Agricultural Act of 1973, some of the Congressional leaders on the Agricultural Committee from this area of the country were very influential in getting that in the Act with White House approval. Some of us felt that this would clarify the problem.

I might point this out, that for the 1975 budget the administration recommended about $120 million for a consolidated conservation program, the Congress did not approve the consolidated program, but authorized $190 million for ACP, $25 million for FIP, then with the economy situation it got caught up in the budget recession problem. Instead of being able to announce a program last December we had to wait until now to announce a program.

Well, we are glad that we are now able to say that there will be a conservation cost-sharing program at the $190 million level in 1975.

Mr. Svore:

Is that 1-year money? Does that have to be allocated in 1975?

Mr. Sallee:

Yes, it has to be obligated by December 31, 1975, but not necessarily expended. For example, there are long-term agreements that are a part of the program now, so it doesn't have to all be expended.

ASCS will be having meetings in the next couple of weeks with the leadership in our state offices, our state committeemen, the Soil Conservation Service and the Forest Service in developing the program for 1975, and many of you in this meeting today will be involved at the state level.

I would like to call on Jack Provin, our state program specialist for Missouri, to comment regarding program development at the state level. Jack, do you have anything to add here about what you see in the next few weeks in Missouri in the development of the ACP program.

Mr. Jack Provin (U.S. Department of Agriculture, Columbia, Missouri):

All agencies in our state with respect to related agency and farm organization people who are interested in agriculture are invited in to help develop a program.

The practices that are assigned, there has been some talk about changing practice specifications. These are developed by the agency that has the technical responsibility. I feel that we are keeping abreast with technology for our conservation. Some of the practices that we would like to see come back into the program; that we have had in Missouri have been kicked out; some that have been mentioned.

I would only say that any body who could do anything to help get a little more flexibility and some other practices back into the program certainly would be appreciated in Missouri.

Mr. Svore:

Thank you.

Are there any questions regarding the program?

Yes.

Mr. Jim Frank (Illinois Environmental Protection Agency, Springfield, Illinois):

Does it include livestock waste management system as we do it in the REAP program?

Mr. Sallee:

I would say now not as in the 1973 REAP. However, let me not go further into types of practices. Monday and Tuesday there will be some major decisions made in Washington. There are still some decisions to be made. We are unable to announce the full details. Some more of these involvements, you know. Then the program will be out to the field, hopefully by the middle of next week (see Appendix II for ACP information).

Mr. Svore:

Are there any other questions?

Mr. Oren Long:

I would like to ask a question of this gentleman. Since Iowa has had more experience with erosion and sediment control legislation than any other state, are they satisfied with the legislation they have or would they rather have model legislation? Could you get a few of the Iowa legislature and would agricultural industry back you up like they did on the other legislation?

Mr. Lindquist:

I don't know which of the four or five questions to start with, but I think the current legislation is working quite effectively, and one of the reasons it is working effectively is because it's a reasonable program.

There was a reference in the paper to the fact that the model legislation required an interagency team to develop the standard, and this is not required in the law, but I would comment that at the state level guidelines were developed utilizing people from many agencies and many fields of expertise to develop standards or model standards based on the soil types, the topography and the other factors associated with erosion. These guidelines were used then by the other 100 districts to develop their own standard and, as stated, there was not one formal complaint filed at any of the 100 hearings.

So we feel we have got a workable program. It is functioning, it is serving the purpose. The means are there. The one disadvantage, to some people, perhaps, is the fact that damage must first occur before action can be taken. But up to this point any compaints that have been filed have been taken care of without the need to go to the District Court and seek its assistance.

Mr. Svore:

A question here?

Mr. Bob Schultz (University of Arkansas):

I have a question for Mr. Lindquist.

Given that damages have to be proven, I would like to know, first of all, how are damages proven and in the case that we do prove that a given amount of damages have taken place, is there any comparison of the cost of corrective mechanisms relative to the cost of damages? Let's just say that the costs were greater than the decrease in the damages which would result, would they still go ahead and make the correction, or is there any leeway?

Mr. Lindquist:

Okay. The requirement of being in compliance is not related to the value or the amount of the damage. The fact that you are being damaged is sufficient to file a complaint.

The complaint having been filed, the Soil Conservation District Commissioners are duty bound to investigate and see if the land is being utilized in a proper fashion. In other words, if the particular soil type and topography and the cropping is such that it exceeds the allowable limit on the site where the farming is being done, for example, exceeds that allowable limit, then this operator must come into comformance with the prescribed soil loss limits and then it may be a matter of going to minimum tillage, it may be a matter of terraces, whatever. It's keyed toward preserving the resource in place.

Mr. Schultz:

How do they evaluate the damage? That's what I want to know.

Mr. Lindquist:

The monetary value of the damage that occurred?

Mr. Schultz:

Yes.

Mr. Lindquist:

It is not evaluated. The mere transport of sediment from one property to another property is sufficient cause to file a complaint, the presumption being, see, that the resource is worth preserving on-site and if it's pointed out that it is not being properly utilized, then you are in violation.

Mr. Svore:

A question back there.

Mr. Warren Kester (Farm Journal Magazine):

Where have most of your complaints come from and how extensive have those complaints been?

Mr. Lindquist:

They have been pretty well scattered across the state, probably more across the southern and western part. I can't give you specific cases. It runs in my mind that about 75, I believe, have been filed by individuals. We don't have a true measure, but we are certain in talking with the Commissioners-- and we don't at the state level get too involved in the day-to-day operation because this is a locally administered program, but we feel like there are a number of cases where just the fact that one neighbor pointed it out to another neighbor, they worked it out and voluntary compliance resulted. Of course we are quite certain, but I couldn't give you any statistics on that.

Mr. Svore:

Any other questions?

Mr. Russell T. Odell (Illinois Pollution Control Board, Chicago, Illinois):

Does the sediment have to move across the property boundary under your Iowa law to be a potential violation?

Mr. Lindquist:

Yes, sir.

Mr. Svore:

It seems to me that one of the problems with that law is that the farmers that live next to each other may be friends and they don't like to file a complaint against their friend. Do you feel that this is a deterrent to make the law work the way it should?

Mr. Lindquist:

Well, I'm sure that has affected some cases. Nonetheless, it focuses attention on the problem and it is perhaps one of the reasons why state cost-sharing funds became available, which certainly helped a number of conditions.

We think it works real well.

Mr. Svore:

Any other questions?

Thanks a lot, Dan. Appreciate your comments.

Our next speaker this afternoon was born on a farm in Ohio. In fact, I have a feeling that most of the people here in this room were born on a farm, and maybe that's why we still have an interest in the agricultural problems.

Earl McMunn is the Editor of The Ohio Farmer and he is Director of Public Affairs for the Harvest Publishing Company. He holds many positions, directorships in the Ohio Chamber of Commerce, he's on the Ohio State University College Alumni Board, he's a member or was a member of the Ohio Air Pollution Control Board, and belongs to many associations which are almost too numerous to mention. I noticed also that he has various awards from some 10 or a dozen different associations and organizations.

It's with a great deal of pleasure that I introduce Earl McMunn, Editor of The Ohio Farmer.

CONTROL PLANNING - THE FARMER AND AGRIBUSINESS

Earl W. McMunn
Editor
The Ohio Farmer

Mr. McMunn:

Well, thank you, Mr. Chairman, for that introduction. That was much more encouraging than one that I had one time when I went out to speak at a service club and as I was getting ready to speak the Chairman leaned over and said, "You know, I can't take a bit of time to talk about you today in giving my introduction." He says, "I have got to build up the speaker for next week's program who is from Cincinnati." And he said, "Gosh, I hope the tickets sell better for next week than they did for this one."

Well, I noticed in looking over this program that there were nine people listed on this program before I got up here. I used to play some baseball and when we were playing baseball we always had the pitcher, who couldn't hit, as the ninth man on the program. Well, I don't know, I won't tell you much, I'm pretty sure of this, but at least I can be quick.

A little like a football coach we had back in Ohio who went to the coach's convention and he was boasting about this tailback he had. He said, "This boy is the quickest one I have ever seen." He said, "When the ball is snapped, he's gone. There has never been a tackler ever lay a hand on him." He said, "They just can't touch him."

Well, one of the other coaches said, "Well, if you had a ballplayer like that you'd be winning all your games and you haven't been."

He said, "Yes, that's just the trouble. He has one fault." He said, "He's always gone before he has the ball."

So whether I tell you anything, at least I can be quick.

Also I noticed when Dwight Metzler was talking here about these increased demands, always putting the demands a little bit ahead of you, made me think of a fellow we had, in fact he was a lawmaker, in Ohio. He also had some race horses and he entered these horses in a race, or one horse in a race, and he thought the horse could win but he didn't. After the race was over he went to the driver and he was awfully mad and he said, "As you came up around that upper turn there," he said, "that big hole opened up ahead of you." He said, "Why didn't you drive your horse through the hole and win the race?"

And the driver said, "Mr. Powell, did you ever try to drive a horse through a hole that was going away from you?"

Well, I'm glad we finally got around to the point in this program where we are talking about the farmer and agribusiness. You know, this is the place where it happens and we seem to spend a lot of time before we get to that point. I guess this is what we have to do, but all I have to say, I'm going to--I think it can be said in a very few simple words, and if you don't remember anything else just remember this.

There are at least three basic needs if we are to make pollution control a success. We must have REASONABLE GOALS, ABLE LEADERS, and EFFECTIVE COMMUNICATION. I believe many of today's troubles trace directly to early deficiencies in these areas.

Most of our pollution control goals are desirable. Many are attainable, although not always within the time limits some would like. Others are found to be less desirable when the public understands the cost. Then there are those of little or no benefit which should not have been established in the first place.

We are committed to a massive program of environmental improvement and the people are not yet fully aware of the cost. But they are starting to learn. As an example, just two scrubbers for the Ohio Edison Company will cost more than the 250-mile Ohio Turnpike. They may be environmentally desirable, but contribute nothing to the supply of electric power.

Over-zealous environmentalists claimed that utilities and other businesses "could afford the cost." Their slogan was: "Make the polluters pay." They didn't admit that all costs must be paid by customers. For some, it is a rude awakening.

Not many question the need for reasonable controls. These must not be so unworkable or expensive as to stifle our economic system. Unwise environmental regulations can seriously hamper our ability to produce. Rabid environmentalists who would ban or severely curtail almost all insecticides, herbicides, antibiotics and fertilizers aren't dealing with reality.

Many activists have been long on emotion and short in their understanding of basic economics. They ignored the basic principle that "you can't do just one thing." They wanted to change the face of the earth and to do it overnight. They demanded standards designed to attain a high degree of pollution control with little regard for the cost. Now we are getting a clearer look at the cost side of the picture.

A basic environmental consideration is the need for an adequate food supply. We in agriculture shouldn't be forced to defend against irresponsible attacks which make farming more difficult. The people who will really suffer are consumers who want an adequate supply of wholesome food and at reasonable cost. This is what they have been getting. Ill-informed environmentalists should be their problem, not ours!

Many things are desirable. The question is how many are worth the cost to the people involved. And, what are the people willing to pay when they realize it's their money that is being spent?

We must have "environmental impact studies" before many new projects are started. These include such things as nuclear power plants, oil pipelines and many others. Environmental impact deserves consideration. Of equal importance is economic impact. A bankrupt company or individual can do nothing to improve anything.

The time has come to demand ECONOMIC IMPACT STUDIES before granting new power to agencies of government. These studies should spell out the cost to the people involved--not just the tax cost for another item in the budget.

If we are to have a program of enduring value, we must take another look at our priorities. Some types of pollution pose serious threats to the health and welfare of people. Others are minor in nature. Still others are no more than speculative and may not even exist.

Some have been blown out of all proportion by faddists and extremists. Some dedicated to the destruction of our economic system have seized upon pollution control as a handy weapon. They speak in scathing tones of "dangerous chemicals" produced by agribusiness "to enrich already bloated business profits." Thus, they engage in a frantic witch hunt, trying to find an enemy to destroy. At the same time, they ignore other threats which are widespread and massive.

In many respects pollution control has been "to meet public demand" rather than to eliminate the most serious threats to health and wellbeing. Too many of us are great at solving problems for others. We are quick with proposals to regulate "the other guy."

We have no shortage of help in cleaning up agricultural pollution. Some of it comes from those who gained "expert" status because of their remoteness from the agricultural scene. Admitted, an expert should have perspective. One way to gain perspective is to look at things from a distance.

When we really have trouble is in solving problems as close as our nose. Imagine the dismay if we were here to talk about controlling a really massive and widespread threat to human health. For instance, cigarettes, cancer and heart disease. Then we would be in trouble. Our experts would be few and gifted with little fervor. We would have no compelling majority. We would be unable to throw the mass of public opinion against a feeble minority.

They didn't admit as much, but lawmakers understood this quirk of human nature when they passed our present pollution control laws. Many are willing to control other polluters. But, what we do is our business.

Congress in its wisdom set out to eliminate some forms of pollution. Slated for attack was an impressive list of "bad guys." We didn't necessarily dedicate ourselves to correcting the most dangerous hazards. At least, not in order of importance. Neither have we done enough as yet to establish our priorities on a cost-benefit basis. That may come with time. It must if we are to have programs of enduring value.

We have attempted to learn from mistakes of the past in developing a land pollution control plan for Ohio. It has been several years in the making. Many able people are involved. They include farmers, researchers, government workers, educators, members of the agribusiness community, soil conservation district leaders, communicators, and many others.

The basic concept is that pollution is controlled when erosion is held to recommended levels. The idea is to prevent erosion. This is not new. It was the big mission of the Soil Conservation Service in the days of Hugh H. Bennett and others who saw the need for protecting our soil resources. Soil Conservation Districts were organized. They became a vehicle for developing plans and encouraging farmers to adopt conservation methods.

In 1970 the Ohio Federation of Soil and Water Conservation Districts started positive action to develop a pollution control plan. District leaders felt that public pressure would force the Ohio General Assembly to act, and that they were likely to do so in a climate of relative ignorance. Agricultural leaders preferred to be ready with a plan of their own making. They recalled that districts have been environmentally oriented since they were created more than 30 years ago.

Since then legislation has been passed which supports the position of district leaders. It authorized appointment of a special technical advisory board to assist the Division of Soil and Water Districts in developing an agricultural pollution abatement program.

The advisory board was made up of 11 members. It represents farmers, ecologists, district supervisors, agricultural industry, The Ohio State University, Agricultural Research and Development Center, the Ohio Department of Agriculture, the U.S. Soil Conservation Service, and the U.S. Agricultural Stabilization and Conservation Service.

The advisory board sorted possible agricultural pollution into four main categories. These were sediment, animal wastes, chemicals, and air pollutants. Extensive reports were prepared in gathering and interpreting the facts.

It was found, for instance, that recommended levels of fertilizer application are basically nonpolluting if erosion is controlled. And, recommended levels are rarely exceeded. Actually, in many cases, increasing fertilizer applications to recommended levels would tend to reduce pollution. Most of the fertilizer nutrients that get into public waters from farm land are attached to soil particles. Reduce soil losses and you reduce pollution.

Ohio's proposed agricultural program is intended to help landowners who have problems. It recommends that landowners be required to practice a reasonable amount of conservation. State standards would be the soil loss tolerance values used by the U.S. Soil Conservation Service in conservation plans.

A 10-year phase-in period is recommended. This is so landowners can make equipment or cropping system adjustments to meet the final standards.

The Universal Soil Loss Equation would be employed to predict soil loss. It would be the tool used to decide the necessary level of conservation. The proposed regulation allows agriculture a reasonable amount of soil loss just as would occur in nature. But, it restricts flagrant misuse and treatment of soil at the expense of environmental degradation.

The proposal also includes state cost sharing as a fundamental principle. Cost sharing is not suggested for practices which directly increase yields or reduce labor costs.

Legislation is now being prepared to implement regulatory and enforcement procedures called for in the proposal.

If there was ever a place where factual and objective communication is needed, it is in telling the story of pollution control. If there was ever a time, it is now.

We have not suffered for lack of words. The outpouring of copy has been overwhelming. There has been much factual information. Too much, however, has been slanted and biased. Much of this has been designed to inflame emotions rather than to lead people to thoughtful decisions. Such journalistic endeavors may "get action." They may also set the stage for massive catastrophe.

Here is perhaps our greatest challenge--also our greatest opportunity. Communication is the tool that gets things done. We have done a fair job of communicating with farm people. Scientific knowledge has been carried from the laboratories and the test plots to farms where it was put to use.

Now we face a new challenge. We must continue to communicate within our industry. We must also communicate with groups far removed from the field of agriculture. What upsets us is that nonfarm people are increasingly calling the tune where our vital interests are concerned.

Already, agricultural spokesmen have wasted a lot of time talking among themselves in the vain hope that nonfarm people just might overhear and understand.

The knowledge explosion has been a boon to mankind. From a communication standpoint, it is a handicap. The whole store of knowledge is beyond the power of a single individual to comprehend, much less convey effectively. And, who has the time or inclination to listen?

We must choose a few basic ideas and concentrate on these. Here are some questions we must answer:

What, really, is the message we should tell?

Why do we want to tell it?

Who do we want to reach?

Who should do the telling?

What "vehicles" can transport our message?

A successful program of information must be continuing in nature. All too often we attend a seminar or conference. Ideas are batted around. Many of them are good. Fifteen minutes before the meeting breaks up, someone says: "We'd better get this out to the press. Someone should write a release." A lot more is needed if we are to get the job done.

We must not ignore human nature in planning our communications strategies. We'd like to believe people make rational decisions on the basis of scientific fact. In many cases it doesn't work this way.

When it comes to swaying public opinion, many of us in agriculture are saddled with a severe handicap. We have been schooled in the scientific approach. This assumes you get factual information on the basis of research. Then, you use the facts to make rational decisions. Human nature doesn't always react that way. It is easier and more exciting to be swayed by emotion.

We are concerned about getting our information to "the public." We forget there is no single "public." Environmental improvement means one thing to a farmer who already understands something about conservation and wise land use. It may mean something quite different to a city dweller who envisions only a world of furred and feathered friends.

We must plan our communications on the basis of meaning to the people we are attempting to reach. Little or nothing will be accomplished by opposing an idea because it will "hurt farmers." Only a farmer is likely to care. It is a different story when we are talking about a favorable environment for people. This includes heat, light, food and a host of other things. We are all in this together. Eliminating pollution isn't the whole answer. The moon is sterile enough, but it is a poor place for people.

A key principle is to have a message which is relevant, then deliver it in terms others will understand. Our country has problems. No doubt about it. Ours are the problems of affluence. These are better than the problems of poverty and starvation.

We also have answers. Protesters and agitators have been getting much of the attention. Their approach is negative in nature. They don't provide the answers. The answers are to be found in our store of scientific knowledge. But knowledge is useless unless it is communicated.

Here is our opportunity. It is also our responsibility. People are being deluged with ideas. Many are constructive. Others would limit or destroy the things which have made America great. It matters not whether this is ignorance or deliberate intent--the result is the same. Information to build a better America cannot be based upon emotion, ignorance, half truths or wishful thinking. We must know and proclaim the truth!

A productive agriculture is basic to our high standard of living. It is the only hope for a hungry world. We can hold pollution within acceptable limits by working with producers on a positive basis. Little is accomplished by creating adversary roles. Most members of the farm and agribusiness community understand this. We'll improve our chances for success if we have reasonable goals, able leaders and effective communication.

Mr. Svore:

Before the coffee break, Earl, would it help my credibility if I told you I have a sign in my conference room and also in my office that says "Thank you for not smoking in here?" I have been making snide remarks to my secretary for 6 years about her smoking and she finally quit the other day.

Mr. McMunn:

I have one, too, and she hasn't quit.

Mr. Shilling:

Could I make a brief comment? Did you ever think that if all of us who smoke these things quit how many tobacco farmers are going to go out of business?

Mr. McMunn:

I know there is always a rationalization.

Mr. Svore:

All us farmers thank you.

I have managed to get us behind time. Do you suppose we could get back here in about 10 min? We will now have a coffee break.

(COFFEE BREAK)

PANEL DISCUSSION:

THE DEVELOPMENT OF A PRACTICABLE AGRICULTURAL POLLUTION CONTROL PLAN

Panel Members:

Dr. Samuel R. Aldrich
Mr. Charles F. Bredahl
Mr. R. M. Davis
Mr. J. H. Ebbinghaus
Mr. Dan Lindquist
Dr. Thomas A. Murphy
Mr. Earl W. McMunn
Mr. William C. Shilling
Mr. Jerome H. Svore
Mr. David G. Unger

Moderator:

Dr. A. D. McElroy
Midwest Research Institute

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Dr. McElroy:

This part of the program is entitled, "The Development of a Practicable Agricultural Pollution Control Plan." This is a very ambitious objective for whatever time we have left here.

It is self-evident that we haven't very clearly laid out such a plan during the day. We have discussed a lot of the issues, and the elements of what might be in a plan, but we obviously have not come to a consensus of what this plan should be. We now have the opportunity to talk over what has been said earlier in the day, and hopefully, to crystallize the words and ideas into a semblance of planning or policy.

Our panel includes Mr. Charles Bredahl, Executive Secretary of the State Conservation Commission in Kansas, standing in for Dwight Metzler, and Jim Ebbinghaus, who is Assistant Executive Secretary of the Farm and Industrial Equipment Institute in Chicago, and represents a segment of the agricultural community which we have not heard from today. Jim will take the opportunity to say a few words now.

Mr. Ebbinghaus:

Thank you. When I initially received an announcement of the program, I noticed that neither the farm nor industrial equipment industry was included on the program, and I asked if there was a chance to say a few words. I asked because farm equipment is used in all farming and is a fundamental part of all the things that we have discussed today.

As Earl McMunn stated, we have some communication problems One concerns the availability of farm equipment to meet the requirements of conservation tillage, minimum tillage or whatever it's called. Let me assure you that there is adequate equipment available to meet all the perceived needs that I heard talked about for sediment control.

We are a technology-intensive industry. Our sales of farm equipment are greatly in excess of $7 billion a year. Our research and development expenditures are greater than the total ARS budget, and we do a lot of things in the agricultural research area. About a year ago, when model legislation was being talked about we had a program to see how we fit and where there were voids and gaps in research that may need to be filled. We found out in our conference that there is a misunderstanding, really, of what equipment is available.

A lot of equipment has been developed that never really made it in the marketplace, for various reasons. The technology is still there, and if the need is there, some of these designs can be resurrected. I want to share with you several words that relate to this: Chisel plows, strip tillage planers, such as "Sidewinder," tillage planers, no-till planers, and double cropping in wheat. This machinery is only part of the equipment our industry has available or potentially available. There are thousands of brochures, there's a great amount of advertising, there are a number of books on tillage, conservation tillage, minimum tillage, reduced tillage, and so forth. We have large numbers of schools for farm equipment dealers, and their organization has a profound influence in agriculture. There are just lots of resources available to you.

I have heard much about regulations, and I would say that our industry at this point in time has about all the regulations that it can possibly absorb and put into practice. We are certainly strong on voluntary action, perhaps to the point of playing an adversary role. I think our voluntary action in farm equipment has been very meaningful. I cite a couple of examples of voluntary action.

There isn't any piece of equipment that doesn't have shielding on it. No regulations required. People know it's good for them. Took a lot of education.

In the conservation tillage area, I want to share some statistics on voluntary action that is working very well. In 1972, it was reported in the No Till magazine that 39.1% of the acres under cultivation in Maryland had minimum or no till. In Kentucky, 31.5% of the total acres; in Virginia, 16%; in New Jersey, 7.3%; in Indiana, 3.7%. How many acres does this mean all together? Well, in 1972, it was 29.7 million; in 1973 it jumped to 33.3 million acres.

I really think what we see as an industry and what we are trying to advocate in one way or another is the big challenge in education. We all know the benefits of sediment control, but somehow there are some images that have to be changed.

Let me just cite an example. When I was growing up, one of the real traditions was that a really clean plowed field was a beautiful field. I would say a beautiful field today would be one that would suggest you have a lot of trash. There are still a lot of people today who feel that beauty is a very black earth turned up, perfect, with no trash showing. This does suggest new systems and new communications. In practical terms, we need to think that conservation farming fits the system. A lot of people feel that conservation tillage, minimum tillage, what-have-you, means a brand new system of farming, and lots of brand new equipment is needed. This is just not a true statement; equipment is available, and a lot of it is already on the farm.

Now, if new equipment is needed, what can we do as an industry? We have to know what the need is, when it's needed, where it's needed, how many, and have some lead time. It takes about 3 years lead time to test a tool and get it on the market. And the product has to have acceptability and provide some monetary return.

To sum up what I heard today: the problems are complex, and we must organize effectively to deal with them. All I can offer to you from the Farm Industrial Equipment Institute or Agricultural Research Committee is that if you want us to cooperate and be a part of your program, we are very willing and able to help you, and our resources are available for your use.

I thank you for the opportunity of being here.

Dr. McElroy:

Thank you, Jim.

The speakers and their audience have made several points, many times, which in part sum up the status of agriculture and its relation to the environment. We have heard repeatedly that the problems are complex, that every river basin is different and requires a different control strategy.

We have heard that some of the problems are relatively well understood and some of them are not at all well understood, that this problem we are dealing with is very varied with regard to our ability to understand it and to know what to do.

We have heard that change has to come, that it has to accelerate. And we have heard several times that it's going to cost money, lots of money, and that we really haven't been spending very much money compared to what we have spent on other programs. In this connection we might do well to compare defense spending with conservation spending, and reflect a bit on priorities.

We have heard that we aren't sure what the side effects of pollution control might be. In other words, we are not quite safe in saying that we can make certain changes and not be unconcerned that we might create another problem. This is a part of what we have to face up to.

We have heard that the solution requires careful planning, a rational approach, and, again, lots of money. We have heard quite often, and it bears repeating, that soil conservation is consistent with water quality and the two most of the time go hand in hand. It has been pointed out, however, that soil conservation, or retention of soil on the land, is not always consistent with water quality.

The inititative is still on the local basis with the states. They still have much to say about what plans are to be, what standards are to be developed, what kind of implementation, enforcement if you like, is to take place. In this connection, we have been assured that there's lots of local talent available: the water quality people, the agricultural people, the extension service, and so on.

I sense much frustration in that this talent, which includes those here today, is grappling with, but not quite, resolving the issues. Why?

Do we have discussion?

Mr. Paul Jacobson (Dow City, Iowa):

I would like to make a comment. I don't know how you would classify me. I worked 30 years for the Soil Conservation Service. And since that time, I have worked with Harza Engineering Company for 10 years out of Chicago. I now farm a 320-acre farm in the rough rolling hills of western Iowa, for 5 years. So you see, I have put in quite a few years on the soil conservation program.

Coming down from Dow City, Iowa, yesterday, I passed through one of the most erosive areas in the world, or at least in the United States. It's a deep loess area. Our Corps of Engineers has run water sample studies on the Soldier River up there, and got 10 tons annually off every acre, so you know it's well above the allowable limits. As I drove from Dow City through 150 miles of this area yesterday, I was very much impressed at the 70% that wasn't accomplished. I think this is the thing we have got to be looking at, not at the 30% that we have already got accomplished. How are we going to get the rest done?

In this area, the slopes run about 12% or over. The soil is deep loess, so you can take lots of erosion. But the amount of erosion is tremendous.

What's happended the last 2 years since we went to intensive cropping? At one time, that area was pretty well controlled with considerable grass in the area. Today as you drive through that same area, you find it's almost 100% corn, just like the rest of Iowa. You have to think about what are we going to do.

In that trip, I got one little inspiration as I passed through Shenandoah, Iowa, and into Tarkio, Missouri. In the old Tarkio watershed a long time ago, we started one of the first programs, at a time when we very much concentrated our efforts on an individual area. Today in that area you will still find a considerable amount of the terracing that went into that area and you will be impressed, as I was, that here is an area that still has conservation after 40-some years; these people have stayed with it. Why? Because neighbors working together have got this thing going so that it has stayed in operation.

If you don't believe that I believe in these things, you can come up and look at my own farm. It has one of the most complete erosion control programs there is in the world. I changed a lot of things on that farm for the same reason that farmers don't adopt practices: some of them aren't practical enough, you can't farm it after you put them on and if you can't, they are not going to do it. As a result of some of the things I have done on that farm, I have changed a lot of my ideas of soil conservation. And we have put on a program I will match with any program there is anywhere in the world. There are some problems with my program. These are the things that society has to stand up and bear the cost of if they are going to get farmers to adopt them.

In the end, if you are going to get conservation adopted, I think you are going to have to go back, Mel, to your watershed idea. You did it on downstream engineering. Now, let's push again on upstream programs and get this conservation up here on the hills. Like H. H. Bennett said long ago, if you don't accomplish erosion control up there on the top of the hills, all the other programs are in vain.

I have spoken a long time, but I am very sincere about this because I think we need to take some looks at some of the past things we did, how we got conservation on particular areas, and then use our experience where we had high success and got lots of conservation. If we do that, I think we are going to get that 70% done, or a greater portion of it.

I would like to bring one question to Dr. Aldrich. He stated that several watersheds in Illinois showed less erosion recently than in an earlier period, and that the records seemed to show that we have less erosion with more intensive farming. I am concerned about the scientific validity of the conclusion and would like Dr. Aldrich to comment.

Dr. Aldrich:

I thought I left the impression, or tried to, that I was challenging people here to go back and look at that kind of data and see whether it did stand up now. I can give you a lot of other information in response to your question here. I think it's so specific we might better talk about it afterwards, or I will send you what the references are and let you take it from there.

Mr. Unger:

Mr. Chairman, several of us have to catch a plane in a few minutes, and I want to get in one proposal before we leave.

We are supposed to talk about the development of a practicable agricultural pollution control plan, and I would like to ask Mr. Svore or anybody else from EPA, if they don't think that the first step in developing such a plan would be the definition, by the EPA, of nonpoint source pollution.

Mr. Svore:

Yes, but, I'm not going to comment any further on that point because they do that kind of thing in Washington.

But another thing they are doing in Washington has to do with one of the requirements of Public Law 92-500, and that is the establishment of a national water commission to take a look at the Act and see what changes or modifications might be justified in the future.

Dr. Dan Wells is here today; Dan is at the present time on leave from Texas Tech., working for the National Commission on Water Quality.

Dan, would you mind commenting briefly about what you think this commission may do in the area of nonpoint source pollution as far as 92-500 is concerned?

Dr. Dan M. Wells (National Commission on Water Quality, Washington, D.C.):

(Declined to comment)

Mr. Dave Nicholson (Weyerhaeuser Company):

I have a question that has bothered me for some time that one of the EPA people perhaps can address. One way of controlling sedimentation from going into receiving waters is to build a sedimentation pond. Does this sedimentation pond become a point source of pollution, and does it require an NPDS permit?

Mr. Svore:

I wouldn't imagine that it's any different from any of the other of the hundreds of thousands of reservoirs that are built throughout this part of the country. They all have some kind of an overflow, many of which are piped overflows. We certainly aren't writing permits on them.

Mr. Sallee:

The Corps of Engineers has been involved in a lawsuit recently with respect to the definition of what is navigable water. It appears to some of us that this expansion of the definition as ordered by the court last Thursday is going to put them into the regulating of farm activities along meandering streams.

What's your interpretation of all this? How does this affect your nonpoint program? Will it reduce the nonpoint area and put more in the point source area?

Mr. Svore:

I think we are going along with the Corps on that. We felt that there ought to be some uniformity of what is a navigable stream and what is the federal government's involvement. They had their definition and we had ours.

Mr. Sallee:

What's the definition?

Mr. Svore:

One of the things that I imagine this court case would do--and I shouldn't even comment on this because I haven't seen the decision--would at least bring some uniformity along that line. There have been questions on what's a navigable stream for quite some time. But, I'm not well enough acquainted with what the court did to really answer your question.

Mr. Steve Oltmans (Lower Elkhorn NRD, Norfolk, Nebraska):

Mr. Chairman, I would like to get some feedback from the panelists, if I may. We are quite concerned in our basin with nonpoint in that out of our total district area, 86 to 87% of it is going to be tilled this year. And contrary to the gentlemen representing the equipment people, we plow most everything there. We have got a long way to go, and we are working with these people as well as many others.

But let me first explore with you what we have done, very briefly.

When the President vetoed or tabled or held up the funds for the so-called REAP program, we adopted our own local assistance program. We budgeted some quarter of a million dollars and spent that. Technically, it was administered with the SCS.

We also have spent close to $75,000 to $80,000 on point source feed lots. In Nebraska, we produce in the Elkhorn Basin half the beef and pork in our district. We feel we are over the hump on the feedlot issue as far as point pollution is concerned, with control accomplished on 70% of the lots needing control.

We have worked with counties in getting comprehensive planning and county zoning done as, hopefully, a source of some land use control with regard to nonpoint.

We have initiated a reduced tillage program in the last couple of years in which we spent 5% of our budget, roughly $50,000, on a promotional program, hoping that this would help.

Our whole point is that recently the Nebraska Natural Resources Commission came out with our water quality plan as required by Section 208. I think it did quite well on completing that. However, in our basin there is no way we are going to meet water quality standards in the future without tackling the nonpoint problem.

Many things we are able to do now, but we can't continue to finance them all with local funds. The directors sent me down here, and I must report back to my 19 directors, hoping that I have some of these answers.

One of the biggest problems we see in the nonpoint issue is the legal interpretation of the law itself; Dave Unger related to that problem. We need legal interpretation to help us as an agency determine some practical things that we can begin to carry out.

Also, we are going to need some help to get state legislation. We have had a bill drafted in Nebraska for 2 years, and we haven't found a legislator courageous enough to introduce it. I think we will get that done next year, in my opinion.

We have heard about the ASCP program. We are very happy to have $190 million, but that probably will produce about half the production that the $225 million did in the late 60's. That was not nearly enough. And also the $25 million maximum that each area can draw annually is not covering the ball game. That was set up back in the 30's also.

The program needs to be more long-range--it's been too piecemeal, on an annual basis. We have got the LPA program now that is going to be of some help.

Robert Tweedy's name was mentioned. We have had him, as well as representatives of other equipment companies, in for seminars at the local level with the farmers and landowners.

We had an incentive payment program set up through the ACP program before the President cancelled it on December 22, 1972. I think we need an incentive program to get more landowners to try this type of practice.

We have emphasized promotional efforts. We call them promotional efforts because when we talk about education on the local level, it doesn't go over very well. The terminology is very critical. Through these promotional efforts, working with the Extension Service and the Soil Conservation Service in our local district, we now have about 15 papers. We have full-page spreads once a month selling the reduced tillage programs as well as many of our other conservation programs. We buy about $5,000 worth of commercial TV time every year in our area to help sell this program.

We need help financially.

Any comments?

Mr. Svore:

I don't see how I can reply to you. I think what you have just said is an excellent illustration of a program that's working. I think you ought to be sitting up here instead of me. You are to be commended for a job well done.

Mr. Shilling:

I can't answer some of the questions that you asked, and I'm sorry you have to report back to those directors without answers. I would like to comment, however.

In considering the nonpoint sources, and I am talking about all of them, every time we look at them we eventually come up with some sort of an idea of a plan. If it's mining, a mining plan. The strip mining act that has been passed, but I don't think has been signed yet, calls for a plan of some kind. In terms of construction activities, we came up with a water quality management plan, or whatever you want to call it, that incorporates various measures into some method of controlling sediments. We come up with the same thing for silviculture, where you are dealing with a massive forest area.

And we frankly come up with the same sort of thing for agriculture. If you have a fairly large farm that may have 10 or 15 or 20 ditches that might be considered a point source, then we keep coming back to the idea that we can call the plan a water quality management plan. But I think the plan might be the same thing as a soil and water conservation plan as far as the probability of meeting the requirements, and the state or a local agency would deal with this. I believe this is really what they do in Iowa, even though it starts with a complaint.

I would just like to ask you all to think about whether this sort of thing would work on your state and local levels.

The question comes up also that if we do have to issue effluent permits, how do you write the permit? Can you write a permit (and we don't know whether legally this can be done) on the basis of some sort of a planned operation above the "point?" Certainly, you know, trying to enforce a permit that depended on a rain would be a tremendous problem.

From your state and local points of view, strictly in terms of nonpoint, do you feel that a soil and water conservation plan for a farm will meet the requirements of a regulatory program? In other words, if there is a regulatory program that says you must comply with a soil loss requirement, will the development and implementation of a soil and water conservation plan by SCS or a soil and water conservation district meet requirements in your area for a regulatory program?

Mr. Lindquist:

Mr. Chairman, I would like to comment to the gentleman from the Elkhorn in Nebraska. I would like to add my commendations. It sounds like an excellent program.

I think he is expressing some of the same things we have experienced. It's difficult to get enough money, in his case in a river basin, in ours within the state, to really do the job, but I think what has been done demonstrates in both cases that we are dead serious. We are willing to make the effort and spend some money. This long term program, is, in my personal opinion, one of the better things that has come along to lend continuity so that you can expect from one year to the next to have a program and can tell where you are going.

You don't really need to legislate it if you have this kind of a program available. People are inclined to sign up for a program when they can plan their personal finances, when they have a two-way contract, and can get a program installed over a period of years that they can afford to do.

Mr. Fran Bennett (Midwest Research Institute):

The Corps of Engineers has been making dams in this country for a number of years. Most of the good sites for dams have either been identified or have been implemented and used. Very few of these sites have good conservation control practices on the watersheds feeding into these dams. The dams have a predictable life, whether it's 80 years or 150 years which means that at some point in time, they are going to be filled with sediment.

Is it reasonable that we require pollution control and conservation control on the watersheds above the reservoirs to increase their life?

A further comment. I spent about 5 years in India, where most of the catchments and dams are filled with sediment, and there are no other places to make catchments for irrigation water retention.

Dr. McElroy:

Mr. Bredahl, perhaps that's one you wuuld like to make a comment on.

Mr. Bredahl:

I think it's reasonable to require the Corps of Engineers to have a stipulated amount of conservation above reservoirs, just as the Soil Conservation Service does for watershed dams, but I think it's a Herculean task. Tuttle Creek at the mouth of the Blue River has several thousand square miles of drainage above it. It would take a long time.

Dr. McElroy:

Mr. Svore will officially close the meeting. I would like to say in behalf of the Institute that we have appreciated the audience, we have appreciated the speakers, and we have appreciated the opportunity to participate with you people in this Conference.

Mr. Svore:

I want to thank MRI officially for a job well done in setting up this meeting. I want to thank you all for being here. I think that a session such as this at least leads us a little ways further down the road to coming up with at least a partial solution to what we consider one of the most serious pollution problems, certainly in this part of the country.

And I thank you all again for coming.

APPENDIX I

LUNCHEON SPEECH
POLLUTION CONTROL: ECONOMIC PROBLEMS AND OPPORTUNITIES

John A. Schnittker
President
Schnittker Associates

Dr. Hubbard:

Today's luncheon speaker is appropriate to the occasion for several reasons. He is one of this country's best known and most distinguished agricultural economists. Like many of the other speakers he is a native of this region and received his professional training at Kansas State and Iowa State Universities.

John A. Schnittker, President of Schnittker Associates, directs the firm's studies in the United States and abroad. In 1970 and 1971, Mr. Schnittker was Vice President of Robert R. Nathan Associates, where he was engaged in agricultural and food sector studies, and directed work in postal rates, transport regulation, and agricultural trade.

He was Undersecretary of Agriculture and President of the Commodity Credit Corporation from 1965 to 1969. His prior service with the Department of Agriculture included positions as Director of Agricultural Economics (1964 to 1965), and staff analyst, policy advisor, legislative draftsman, and as official spokesman for the Department. As Undersecretary, Mr. Schnittker was responsible for program planning, for domestic and foreign operations of the Commodity Credit Corporation, and, in the absence of the Secretary of Agriculture, for all programs of the U.S. Department of Agriculture. Mr. Schnittker served as senior representative of the Department of Agriculture in the Kennedy Round of trade negotiations from 1965 to 1967.

Earlier today a member of the press asked me, "How much is this pollution control going to add to the food bill?" Unfortunately I couldn't answer the question. I'm not sure that John can either, but I am sure that we will be better informed on the subject after we hear what he has to say.

John.

POLLUTION CONTROL: ECONOMIC PROBLEMS AND OPPORTUNITIES

Perspective

The goal of clean water for the U.S. can have a profound impact on American agriculture and on world food supplies. The near shortages of food and high prices of recent years have generated a renewed debate over the apparent conflicts in the objectives of a cleaner environment and feeding an expanding population at reasonable prices. Environmental goals are sometimes seen as possibly constricting U.S. agricultural production, limiting returns to the farm sector by increasing production costs, or eliminating profitable foreign markets for U.S. agricultural products.

I do not intend to minimize the potential conflicts between environmental and food supply goals, but we must keep them in perspective. Often the problems associated with environmental regulations will be more closely related to factors other than agriculture. Several examples can serve to illustrate the point. Concern has been expressed that environmental constraints will limit our ability to help feed an ever hungry world, especially Asia. Perhaps this will be true at some time in the future. In recent years, however, the actual constraints on getting food for the world's poor and hungry have been the unwillingness of rich nations to finance a high level of food aid. This situation was changed somewhat recently as a result of the Congressional requirement that at least 70% of our concessional sales go to the "most severely affected" countries, instead of to our military allies in the Middle East and Asia. But in this marketing year, when reduced world grain supplies have required a 20% reduction in grain feeding, the food aid available from the U.S. is in excess of what will actually be shipped.

Concern has also been expressed that environmental considerations will price U.S. agricultural products out of foreign markets. The U.S. has a strong comparative advantage in the production of major farm commodities in world trade. Our competitors and our trading partners are principally the developed countries of the Western World. They, too, are increasingly concerned with improving environmental quality. Our advantage in exporting farm products is not likely to be threatened by environmental consideration.*

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* Cotton is a fairly heavy contributor to agricultural and industrial pollution, and the U.S. comparative advantage in producing cotton is small. We may well produce a smaller share of the world's cotton in the years ahead. This would be so, even without reference to pollution control efforts.

Unwise price support laws or regulations are a far greater risk to our competitive position.

There is no need to search for scapegoats for our agricultural or environmental problems. We should face them directly and jointly find solutions. The world can have enough food, clean water, and a generally safe environment all at the same time, if we will work on it.

Nonpoint Source Pollution Control Measures for Agriculture

In discussing the framework of controls for nonpoint pollution from agriculture, an economic approach involves three principal considerations. First, increasing marginal costs are certain to be associated with pollution control. That is, the cost of taking additional amounts of pollutants from the environment will increase, in certain situations, more than in proportion to the amount of pollutants removed. With increasing costs of removing additional increments, a control plan should not extend beyond the point where costs exceed benefits.

Second, costs of pollution control are not uniform. They will be different for various types of agricultural enterprises and between production units of the same type but of different size or level of management skill. An efficient control plan would require that the greatest reduction in pollution be made from those sources where the unit costs of control are least.

Third, there are likely to be a number of alternative control measures associated with each type of pollutant. A control plan should allow sufficient flexibility to insure that an efficient solution can be adopted by persons or units with different economic characteristics. Control techniques proposed for agriculture in relation to nonpoint source water pollution will often require that farming activities be changed. Thus, environmental control measures will influence the direction of change in agricultural techniques.

The production demands that will be placed on the U.S. farm sector argue for maximum flexibility in environmental control regulations; they should not lock agriculture into production practices that will unduly inhibit our ability to expand or contract agricultural production to meet changing situations.

The principal nonpoint sources of water pollution from agriculture are sediment, pesticides, fertilizers, and plant and animal wastes from cropland and grazing areas. The measures for reducing soil and water runoff under present technology include terraces, strip-cropping, contouring, and crop rotation.

The approaches to reducing the quantity of pesticides entering surface and ground water include: erosion control; reduction of the quantity of pesticides applied to crops; and substitution of nonchemical methods of pest control or use of biodegradable pesticides.

Reduction of nutrient losses from agricultural operations involve improved fertilizer application techniques, including proper timing to insure efficient utilization by plants, tillage and crop rotations, and improved conservation measures that reduce soil and water runoff.

Even this superficial listing of control measures illustrates some potential areas of conflict between reaching environmental goals and achievement of national policies for food production and foreign aid, and individual farm income goals. For example, without alternative measures to maintain productivity, restrictions on pesticide or fertilizer use which reduce levels of food production may from time to time result in higher domestic food prices and smaller quantities available for foreign aid objectives. These effects can be buffered by establishment of grain reserves, or by good growing weather. The key question is: "How much will food prices be affected," not will they be affected.

Unfortunately, data and methodology with which to evaluate these tradeoffs are scarce. While it is essential that the public and private costs and benefits associated with nonpoint pollution control be evaluated so that society can decide appropriate goals based on knowledge of these tradeoffs, for the near term water quality standards and means of achieving them will be based upon very limited knowledge. Lack of information does not mean that standards should be set at a bare minimum, or that water quality control plans should have no teeth. Instead, they should be as flexible as possible to meet changing needs. It means, especially, that control plans should be designed to generate new information on the benefits and costs of water quality control.

In the area of nonpoint source pollution control, most of the economic information generated to date has focused on site-specific farm situations. In considering this type of data, one should bear in mind that they most often assess the direct effects on productivity and income of individual production units. In the aggregate, there can be effects on the level of total agricultural production, the product mix from U.S. agriculture, and on production within the major agricultural regions of the U.S. In turn, these effects have implications for national (and world) supplies of food and fiber, food prices to the consumer, and world trade. However, the first step appears to be a consideration of those site-specific impacts.

For control of erosion and sediment runoff, conservation measures can be shown to pay off, even on an individual farm basis. Farming on the contour has been more profitable, in many situations, than farming up and down the slope (see Table I-1). In cases where the direct benefits are insufficient to justify the additional investment or costs to the farmer, federal cost-sharing has been the most common approach. This remains a generally accepted measure for controlling erosion where the public and private benefits clearly exceed the costs. Thus control plans for improving water quality which embody these generally accepted conservation measures probably would not generate much debate on economic or environmental grounds, but could be carried out under a new version of long-established federal programs. I want to emphasize the need for new approaches to cost-sharing. No federal farm program has been more difficult to adapt to changing needs and conditions than the Agricultural Conservation Program (later renamed Rural Environmental Assistance Program). And it has been in continuous jeopardy from budget-cutters for 20 years, partly because it has not been changed as needed.

However, the issue is less clear-cut when control measures require altered planting and tillage practices to reduce sediment loss. The range of crops that can be most profitably grown in a particular region is usually limited. The introduction of additional crops in a rotation for conservation purposes, while further reducing sediment loss, usually will result in lower returns to the farmer and may present particular marketing problems. Whether the total benefits associated with additional reductions in erosion attributable to changes in crop patterns will exceed the costs is a question which is likely to be answered in different ways, depending upon the crops and region in question.

Reduced tillage systems, in many cases, can significantly reduce soil loss by erosion and reduce production costs without sacrificing output. On the negative side, limited till systems often require some change in a farmer's perception of "good" farming practices (clean tilled fields). They require investment in new types of equipment and salvaging of old at a loss. They often require a higher level of management skill and heavier use of chemical pesticides, which will mean some economic and environmental tradeoffs.

If water quality standards are set to limit soil losses to moderate levels--say to 50% of the estimated annual soil loss from planting up and down on 4 to 6% slopes (see Table I-2)--there is unlikely to be any major impact on American agriculture. The trend of recent decades towards "improved" soil conservation practices would be reinforced, without any real economic or social tradeoffs.

If standards are set at levels high enough to require intensive control procedures and changes in cropping patterns, such as complex crop rotations, there would be a larger impact on the farm sector. Costs would rise and there could be a reduction in production of some major crops. The greatest impact might be in the reduced flexibility of the farm sector to expand or contract production of a crop in any given year as a response to changing market conditions. However, it seems unlikely that significant regional shifts in production would occur under these conditions. For example, it is difficult to envision any environmental constraints that, by themselves, would alter the productive efficiency of the Cornbelt relative to other areas in producing feed crops.

The extent of the water quality problem associated with losses of nitrogen and phosphorus fertilizers varies among regions and crops. The level of fertilizer use depends primarily on its cost relative to the cost of other inputs, and the prices of agricultural products. Put very simply, fertilizer use has increased because it has been very profitable. Control measures center on improved fertilization practices involving proper timing the application of optimal amounts of fertilizers, and the development of slow release fertilizers to improve the efficiency of plants in using nutrients. Such measures may involve some increased costs, but by themselves are unlikely to affect total production levels or returns.

The most lasting effect on fertilizer use patterns will not come from environmental constraints, but from the increased cost of energy. Costs of fertilizer will probably increase over time, although the short-run prices may decline. Higher costs will provide strong incentives to change fertilizer use patterns in ways that limit loss, and thereby also limit pollution. Thus, the energy crisis would provide some unexpected benefits to water quality.

The alternatives to current pesticide use patterns are more complex. With current technology, reducing the level of sediment runoff through reduced tillage generally requires heavier pesticide use (for weed control), and presumably an increasing level of pesticide runoff. The current thrust of pesticide control regulations has placed strong emphasis on restricting the use of the more persistent chemicals. While this will reduce the levels of these chemicals in our water supplies, the alternatives generally involve more complex and costly control techniques. Agricultural pest control under future environmental standards is likely to require higher production costs and a higher level of management skills. It is not yet clear that total productive capacity will be reduced, or that increased instability in output, prices or farm income will result. But these are real possibilities.

Summary

Water quality control measures have the potential for major impacts on American agriculture. However, just as there are large gaps remaining in assessing the significance of the pollutant load from nonpoint agricultural sources, there are large gaps in our understanding of the economic and social tradeoffs associated with clean water goals. Large structural adjustments are in store for agriculture in the coming decades, and only a small portion of these changes can be directly attributed to requirements for meeting environmental quality standards. Many of the problems facing the agricultural sector are influenced more by nonenvironmental factors. We should be careful not to lay too much blame on efforts to limit pollution from agricultural sources.

TABLE 1-1

VALUE OF ACCUMULATED INCOME PER ACRE, BY ROTATION, SLOPE, METHOD OF CULTIVATION, AND LENGTH OF PLANNING HORIZON (Discount Rate of 5.0%), NORTHEASTERN ILLINOIS[a]

Length of Planning Horizon (in years)	Continuous Crop Slope				C-C-SB-O-M Slope				C-C-O-M-M Slope			
	Up and Down		Contouring		Up and Down		Contouring		Up and Down		Contouring	
	4%	6%	4%	6%	4%	6%	4%	6%	4%	6%	4%	6%
	Dollars											
5	103	79	106	83	89	66	90	67	87	69	88	70
10	177	130	185	143	157	113	159	118	154	120	156	123
20	267	180	289	216	245	170	253	184	246	186	250	195
30	310	192	347	251	295	197	309	221	300	223	307	237

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[a] Swanson, E. R., and C. E. Harshbarger, 1963. "An Economic Analysis of Effects of Soil Loss on Crop Yields," Journal of Soil and Water Conservation, Vol. 19, No. 5.

TABLE I-2

ANNUAL SOIL LOSS ESTIMATES FROM SWYGERT SILT LOAM SOIL, BY CROP ROTATION AND PLANTING SYSTEMS[a/]

	Planting Technique			
	Up and Down Slope		Contour	
Crop Rotation	4% Slope	6% Slope	4% Slope	6% Slope
	Tons/Acre			
Continuous corn	18.8	29.2	9.4	14.6
C-C-SB-O-M	7.4	13.6	3.7	6.8
C-C-O-M-M	4.4	8.2	2.2	4.1

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a/ Swanson, E. R., and C. E. Harshbarger, 1963. "An Economic Analysis of Effects of Soil Loss on Crop Yields," Journal of Soil and Water Conservation, Vol. 19, No. 5.

APPENDIX II

1975 AGRICULTURAL CONSERVATION PROGRAM INFORMATION

1975 AGRICULTURAL CONSERVATION PROGRAM INFORMATION

The USDA on April 11 announced the operational procedures for the 1975 Agricultural Conservation Program (ACP). Authority to develop practices needed to solve conservation problems was delegated to the county Agricultural Stabilization and Conservation (ASC) committees in consultation with the county program development group. Practices in the program may include, (a) all approved practices in effect under the 1970 national Agricultural Conservation Program, (b) practices developed in accordance with the 1974 program guidelines, and (c) additional practices needed to solve local conservation problems but not otherwise available. Practices developed by county ASC committees are subject to approval by state ASC committees in consultation with the state program development group.

Throughout the practice development and cost-sharing approval process, ASC state and county committees are to emphasize the objective of assuring that cost-sharing will be for carrying out enduring soil and water conservation measures that the farmer would not perform without this assistance.

The Soil Conservation Service (SCS) is furnishing planning and technical assistance on servicing of practices and long-term agreements. Technical services for forestry practices are being provided by the Forest Service.

The 1975 ACP is being funded at $190 million with an allocation of funds to each state. The level of cost-sharing assistance to farmers under the 1975 program is from 50 to 75% of cost of carrying out the needed conservation practices. The program provides authority for long-term (3 to 10 years) and regular (annual) agreements.

Individuals interested in complete information on the program or who want to sign up to participate should contact their local county ASCS office or the state ASCS office for information on the state program.

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